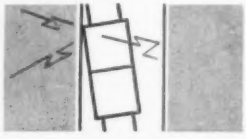
the OIL AND GAS JOURNAL

PB *protection notes*

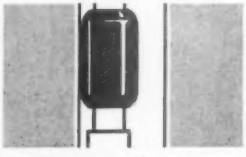
WHY PROTECT?

Engineers, unfamiliar with the complex problems of deep well drilling, often ask, "Why use protectors?" The immediate and obvious answer, of course, is *to reduce friction and wear.* Friction in shallow well drilling is much less of a problem, though it does exist. But deep well drilling often means that more than 10,000 feet of drill pipe stretch between the power source on the rig and the bit at the bottom of the hole... and 10,000 feet of unsupported drill pipe is going to bend and corkscrew, tool joints are going to wear against casing walls... if there are no bearing surfaces to prevent wear.



A protector installed above each tool joint pin holds pipe and joints away from the casing, eliminating unnecessary wear and excessive friction. Because there is less friction, the entire string rotates more freely. This means that less power is required to rotate the bit, and in addition means better control of the weight on the bit.

A less obvious reason for installing protectors is *saving time, equipment and money.* Reduced friction means less torque and faster drilling. Thus costs are reduced because power requirements are lower, and total drilling time per well is less, *and* savings more than offset the total cost of protection.



Most important reason of all for guarding your rig with casing protectors is the saving of almost irreplaceable drill pipe and casing. Frequently, casing alone accounts for more than a third of the total cost of drilling. In addition, it's just plain hard to buy. It's a big investment, and it can be safeguarded best with protectors. The net result of installing 100% protection with PB Casing Protectors is *saving:* saving in power, in time, in money, and in costly casing and drill pipe.

Make a note now to protect with PB.

it's Canny *to save*

CASING PROTECTORS

save drill pipe and casing

It's no secret that drilling is expensive, and with today's scarcity of steel, drill pipe and casing *has to last!* Casing alone often represents more than a third of the total cost of drilling—*protection is important!* Be certain you get maximum protection... Be safe and sure with PB Protectors!

PB Protectors help you save, because they—

Eliminate unnecessary casing wear • Protect tool joints and save drill pipe • Decrease torque and hoisting loads • Reduce the danger of bent pipe, corkscrewing and twist-offs • Prevent metal-to-metal friction • Lower power requirements • Cut drilling time per job

Be Canny Install PB Casing Protectors on your rig... because PB Protectors will help you save!

Available at your nearest supply store or thru your BJ-PB Representative

Byron Jackson Co.

OIL FIELD & INDUSTRIAL SPECIALTIES

PRICE 50 CENTS **JUNE 2, 1952**

You can't get caught in this trap!

NO threads to gall or freeze
NO leaky seals
NO doubt about strength—
conforms to all codes
NO multi-bolt flanges
NO thing to drop

That's UNIBOLT

Self-Sealing Gasket—made of Hycar (oil and gas resistant rubber)—is the final answer to scraper trap leaks. Its lipped design makes it self-sealing under line pressure. The coupling cannot be overtightened to the extent of damaging the gasket or the coupling itself.

Release two bolts. Swing the trap open. Take the pig out or put the pig in. Close the trap and tighten two bolts. That's just how simple and easy it is to operate a UNIBOLT Scraper Trap. An oversize barrel (slightly larger than the o.d. of the pig) makes it equally easy to start a pig. Line pressure does the heavy work.

Pipeliners everywhere are using UNIBOLT closures and couplings for scraper traps, blowdowns, strainers, mist removers and other large diameter pressure vessels. A UNIBOLT representative will gladly explain the advantageous features of these products to you.

THORNHILL-CRAVER CO.

P. O. BOX 1184 UNIBOLT **HOUSTON, TEXAS**

THE OIL AND GAS
JOURNAL
Vol. 51, No. 4

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You'll find no hot spots in a Fairbanks-Morse Motor. Unique cross-flow ventilation assures uniform motor cooling . . . eliminates the hot spots that are so destructive to a stator insulation. Air is taken in at each end of the motor, flows through separated passageways across the stator core, and is exhausted simultaneously at opposite ends. This advantage is standard on all popular size Fairbanks-Morse General Purpose Motors.

Combine cross-flow ventilation with exclusive, indestructible Copperspun Rotors, protected, one-piece cast frame and rugged construction and you'll see why it pays to specify Fairbanks-Morse for your oil field motors. Fairbanks, Morse & Co., Chicago 5, Illinois.

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a name worth remembering

OIL FIELD EQUIPMENT • PUMPS • SCALES
ELECTRIC MOTORS • GENERATORS • LIGHT PLANTS • DIESEL, DUAL FUEL AND GASOLINE ENGINES • MAGNETOS

A thousand and one wire ropes
PREformed and internally lubricated

The experience of hundreds of users—like yourself—goes into the making of Macwhyte Wire Rope. For more than half a century, their needs and yours have been studied by our engineers to produce the best wire rope for each job.

There are a thousand and one ropes to choose from. Recommendations are promptly available from Macwhyte distributors or Macwhyte Company.

Macwhyte Company, 2916 Fourteenth Avenue, Kenosha, Wis. Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope and Wire Rope Assemblies. Mill depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles • Distributors throughout U.S.A.

Catalogs are available on request

1017

You Spent at least $6,000 to create his job... will you spend $2.30 to Protect it?

Eye Accidents Cost $176,000,000 a year in LOST MAN-HOURS alone*

To give a skilled worker the tools and machines to produce, industry invests $6,000 or more per job. If you lose his skill due to an industrial eye accident, you tie up your $6,000 completely if he has no adequate substitute. You lose the production his tools turn out. And if his is a critical "bottleneck" operation, you may tie up entire plant output.

Even a production *slowdown* is grim business in these days of high break even points. Why risk it because of a costly eye accident, when the average cost of a pair of safety goggles that can prevent his eye accident is only $2.30? Call your nearest AO Branch Office and learn how an AO Eye Protection Program can save money well into four figures annually.

*Estimate. Industrial eye injuries cost over $5 per employed worker per year—with compensation averaging nearly $400 per injured man.

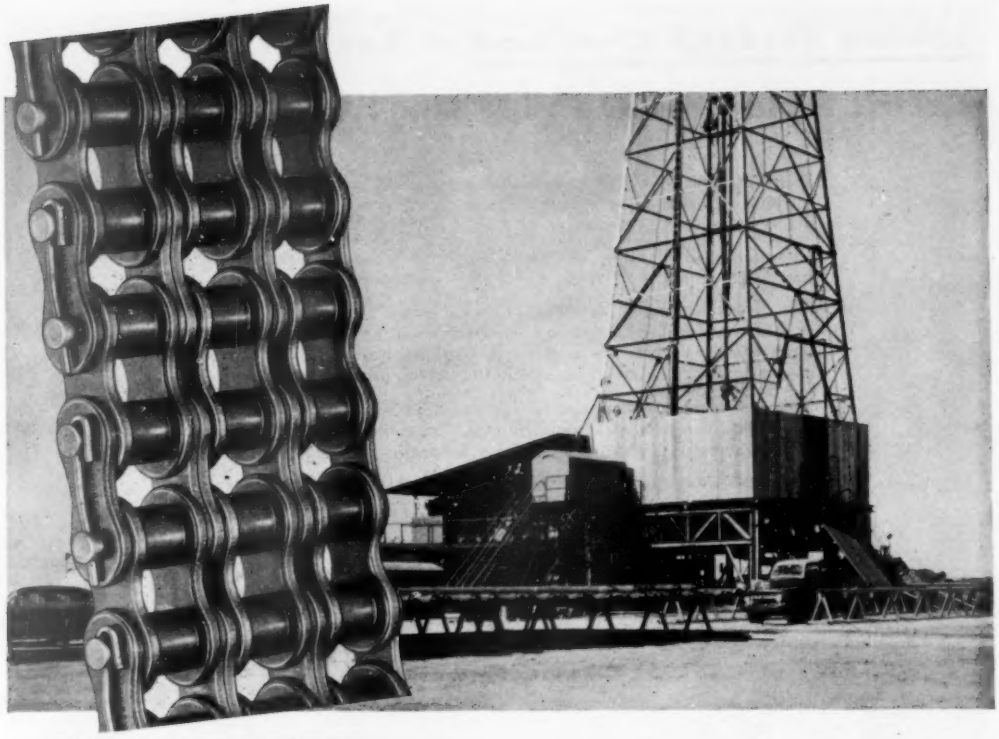
American Optical Company
SAFETY PRODUCTS DIVISION

Write American Optical Company, 445 Vision Park, for free booklet "Improved Industrial Vision" telling how AO's Industrial Vision Program cuts costs, increases production, decreases accidents.

SOUTHBRIDGE, MASSACHUSETTS

BRANCHES IN PRINCIPAL CITIES

The Oil and Gas Journal, published Mondays, copyright 1952, by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly.



Shot Peened Rollers

Thousands of steel balls hammer the case hardened rollers, give them extra fatigue life and added ability to withstand shock and impact.

Patented LINK-BELT E-Z Assembly

This feature permits easy coupling and uncoupling of multiple width chains right on the job.

For Years of No-Stop Power Transmission

Shot peening hammers long life, extra performance into Link-Belt Precision Steel Roller Chain. This is one reason why Link-Belt Chain rolls on and on at high speeds, heavy loads, frequent overloads, long after just average chain gives up the ghost.

Other long life factors are Link-Belt case hardened pins and bushings and manufacture to precision standards that guarantee absolute uniformity throughout.

There is a Link-Belt Roller Chain to solve your most difficult chain problem. Call the nearest Link-Belt engineer to give you all the facts. Specify Link-Belt where *no-stop power transmission* is demanded.

LINK-BELT

PRECISION STEEL ROLLER CHAIN

LINK-BELT COMPANY: Indianapolis 6, Dallas 1, Houston 1, Los Angeles 33, New York 7. Distributors in all fields. 12.702

Coming Through Cleveland — Another Republic

Electric Fusion Welded Pipe Line...65 Miles Long

Busy northern Ohio industries have big appetites for natural gas. This new 26-inch line was essential for extra capacity to maintain vital industrial activity during cold months.

Completion in advance of Great Lakes winter weather meant the big pipe had to go in *fast.* And, it did.

The circumference of Republic Electric Fusion Welded Line Pipe always is constant. Field joints line up accurately and quickly. The entire circumference can be welded at top speed. Uniform wall thickness provides an even distribution of metal all around the pipe to further speed field welding.

This high pressure line pipe is electric fusion welded inside and out. It's hydraulically expanded to uniform size, straightness and circumference... and to increase its yield strength for safe handling of high pressures.

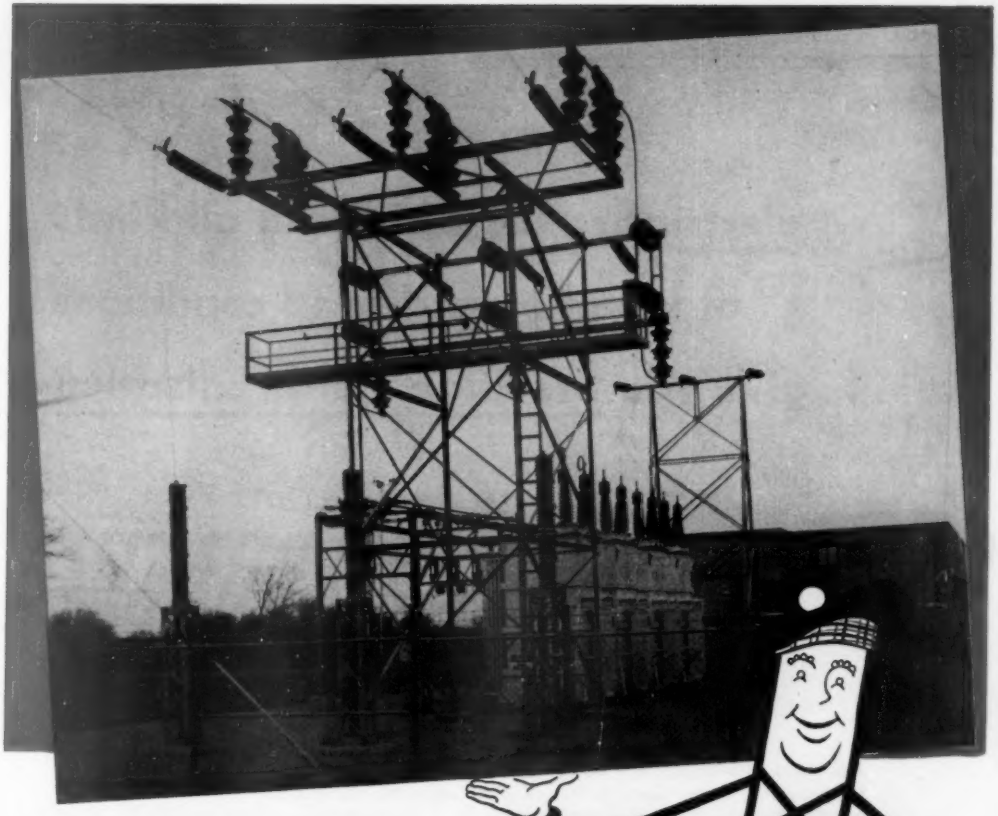
Republic's integrated mill at Gadsden, Alabama, is 100% devoted to producing expanded Electric Fusion Welded Line Pipe in sizes 24- through 30-inch O.D. Every month, more of the big pipe goes on its way to other essential jobs.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

East Ohio Gas Company line from Petersburg, Ohio, to Cleveland, is constructed of 26-inch Republic Electric Fusion Welded Line Pipe, 0.3125" wall thickness.

Republic
REPUBLIC STEEL
ELECTRIC FUSION WELDED LINE PIPE

Other Republic Products include Upson Bolts, Studs, Nuts and Rivets—Pipe—Sheets—Plates—Electronite Heat Exchanger Tubes



I'm shouldering the Power Load for Pipeline Operators . . .

This Crude Pipeline Station, operated by a major company, in Osage County, Oklahoma, utilizing 1-1500 HP motor, 2-1250 HP motors and 1-750 HP motor is powered by Low Cost Electric Power. Yes, PIPELINE OPERATORS have discovered, regardless of the job to be done in moving fluid, that Purchased Electric Power can do it more satisfactorily—*and for less.* Simplify YOUR power problems with Electric Power. Call your nearest Electric Service Company—NOW!

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ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

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electric brakes withstand all kinds of weather and road conditions . . . give you precision synchronization

SAFE STRAIGHT-LINE BRAKING

Ask the men in the oil fields who use Warner Brakes on their trailers just what they think of *electric* braking. They'll tell you that through muck, mud and mire . . . over rough roads . . . during every kind of weather . . . Warner *Electric* Brakes give day-in, day-out *trouble-free, safe* braking.

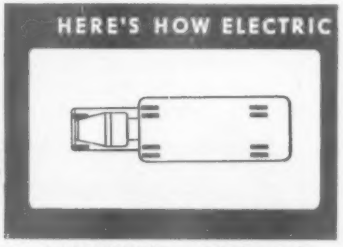
That's because Warner *Electric* Brakes are a "natural" for oil field operations. No other braking system equals Warner's for simplicity. There's *full clearance* under tractor and trailer . . . nothing exposed to get knocked off or leak . . . just simple wiring to each wheel. There's a minimum of parts to check and service.

And with Warner *Electric* Brakes you get *precision synchronization* . . . instantaneous, *uniform* braking of all wheels on both the tractor and trailer. No time-lag in the action . . . braking power is applied *instantly* with the speed of electricity!

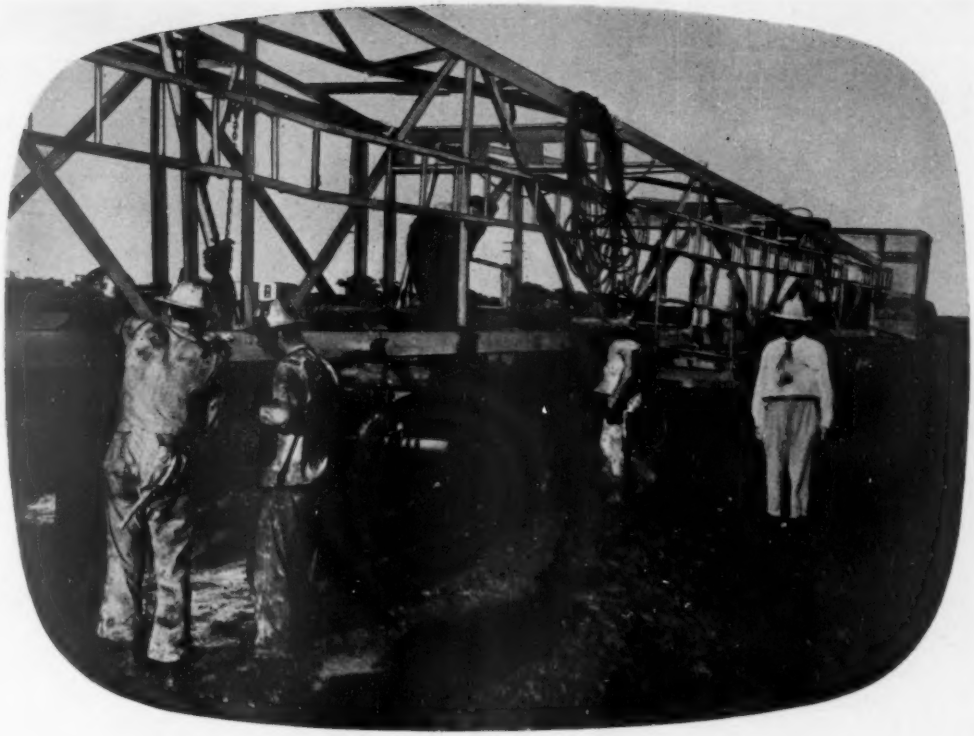
This means smooth, *straight-line* deceleration and stops . . . gives you the ideal braking system for exceptional safety, outstanding dependability.

WARNER ELECTRIC BRAKE & CLUTCH COMPANY, BELOIT, WISCONSIN, U. S. A.

ELECTRIC BRAKES
FOR TRUCK TRAILERS



"WARNER WAY" . . . all brakes reach full power together to keep tractor and trailer in line . . . whether for gradual or fast emergency stops. Here's safe, straight-line braking.



Since 1933, Warner Electric Brakes have been more than proving their worth under tough oil field conditions . . . on floats and pipe trailers of Heldt Bros., Alice, Texas

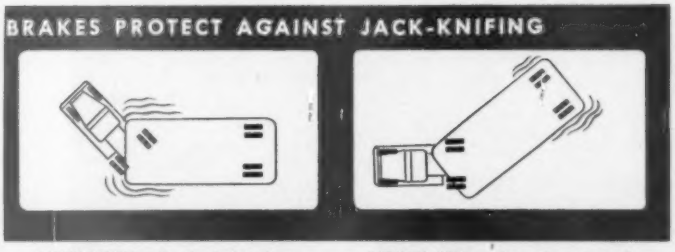
Here's what Heldt Bros. have to say about their experience with Warner Electric Brakes:

"We have been users of Warner Electric Brakes since 1933. Our fleet consists of 80 self loading floats and pipe trailers.

"This photograph shows the conditions under which our equipment operates and the type of treatment Warner Electric Brakes are subjected to.

"We are proud that our fleet won the National Safety Contest for the past two years. We know too, that you will be proud of this record and performance of Warner Electric Brakes."

If you are not already taking advantage of the extra safety and extra dependability provided by Warner *Electric* Brakes, investigate now. Send for free folder shown below.

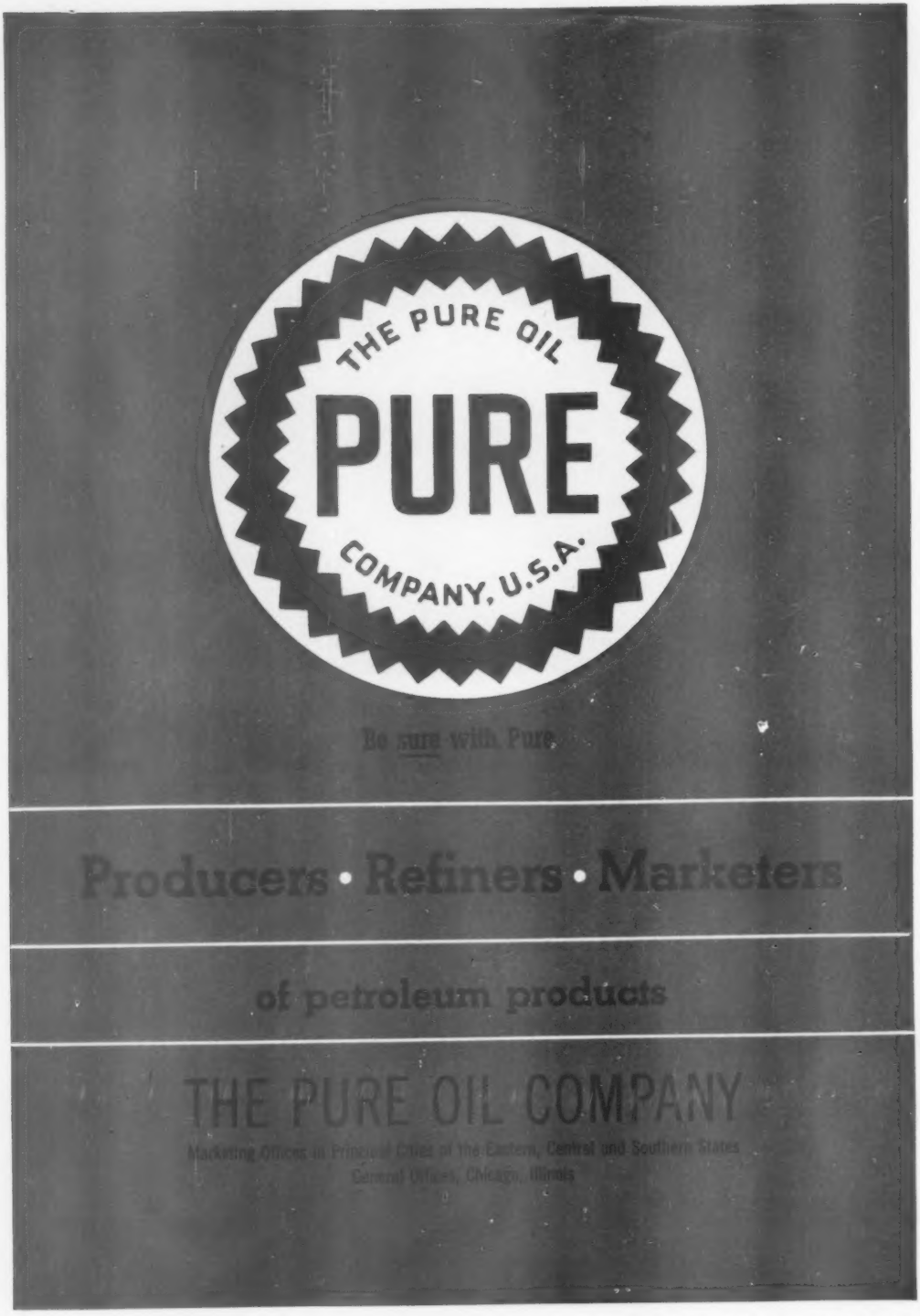


WRONG WAY . . . here's what can happen when brakes aren't synchronized and tractor brakes "come in" ahead. Jack-knife is sudden, drive wheels slide sharply. Recovery is difficult.

WRONG WAY . . . the other type of trouble that can result when brakes are not synchronized. Trailer brakes "build up" first . . . rear of trailer swings, then comes around into a jack-knife.

FREE! **New factual folder "Six Steps to Better Braking for Truck Trailers." Get your copy now.**

Gives important tips on driver safety through synchronized braking. Explains the precise operation, simplicity of hook-up, amazing economy and added safety features of *electric* braking. Write today. Warner Electric Brake & Clutch Company, Dept. OGJ, Beloit, Wisconsin.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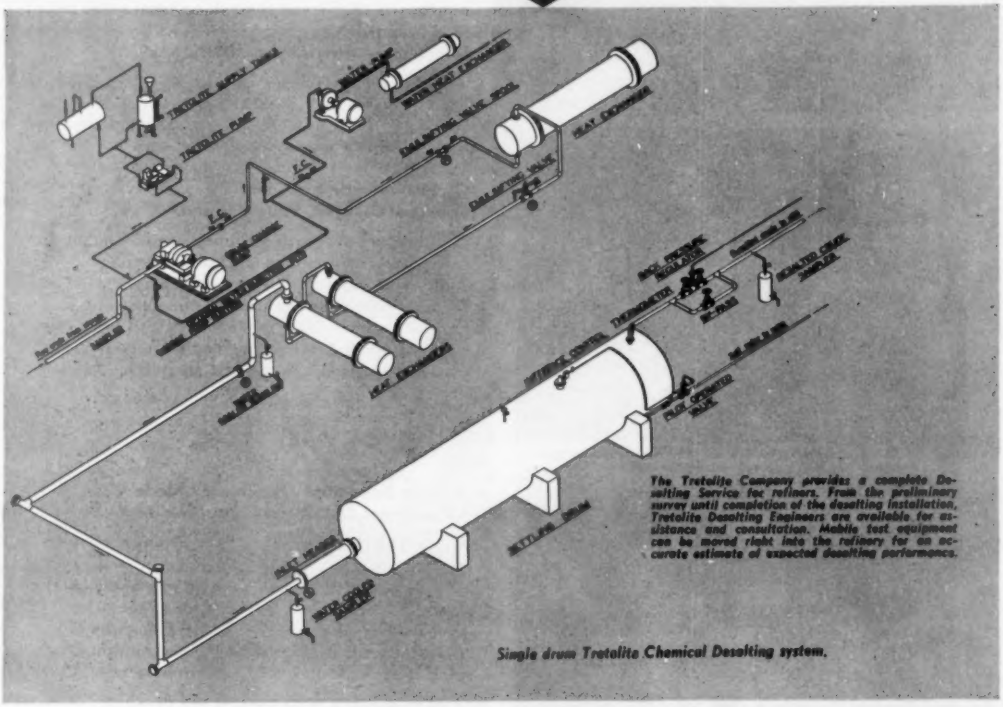
UTILIZES CONVENTIONAL REFINERY EQUIPMENT

Examine the flow diagram below, note the equipment required. Every item is conventional, already available in most refineries. A Tretolite Desalting plant often can be assembled from existing refinery equipment, thereby holding installation costs at minimum.


The Tretolite Company provides a complete Desalting Service for refiners. From the preliminary survey until completion of the desalting installation, Tretolite Desalting Engineers are available for assistance and consultation. Mobile test equipment can be moved right into the refinery for an accurate estimate of expected desalting performance.

Single drum Tretolite Chemical Desalting system.

A recent survey of Tretolite Desalting installations disclosed that Tretolite is now desalting over 1,000,000 barrels per day, with an average salt-removal percentage of 95, at an average cost per barrel of 2.5 mills.

For complete information on Tretolite Desalting, write or call the

TRETOLITE COMPANY

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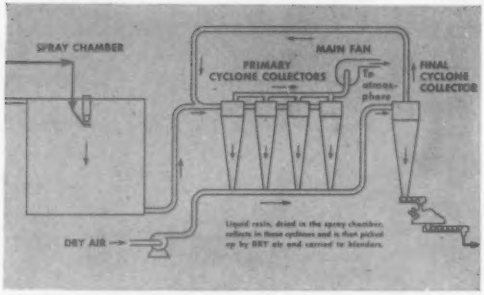
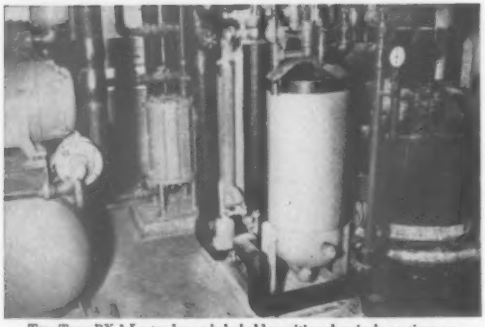
LECTRODRYERS are production tools at these American *Cyanamid* Plants


SPRAY CHAMBER
MAIN FAN
PRIMARY CYCLONE COLLECTORS
To atmosphere
FINAL CYCLONE COLLECTOR
DRY AIR
Liquid resin, dried in the spray chamber, collects in these cyclones and is then picked up by DRY air and carried to blenders.

DRY air picks up powdered resin to keep it DRY at American Cyanamid's Wallingford, Conn. plant

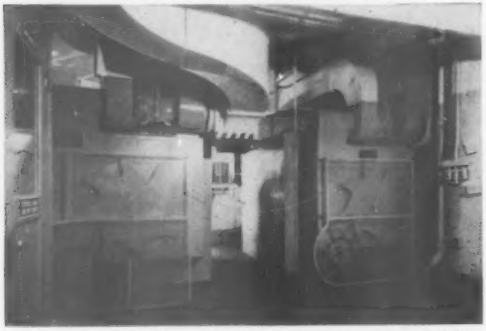
Get molding powders DRY and keep them that way; that's the function of this portion of the production line in this ultramodern plant. There's no moisture in the air that picks up molding powders as they come from the cyclones—no moisture to impair the quality American Cyanamid has compounded into these products.



Two Type BY-1 Lectrodryers help hold sensitive chemical reactions on the beam by DRYing the air supplied to controls.

On instrument air at Calco Chemical Division, Willow Island, W. Va.

No moisture gets into air lines here to condense, form ice, rust or sludge and cause trouble. Two Lectrodryers* designed especially for instrument air work, catch the vaporous moisture which aftercoolers, filters and separators let by. Calco Chemical Division's products are consistently higher in quality, therefore.



Aureomycin and penicillin are packed in a sterile area where the air is held at 6% relative humidity by these Lectrodryers.

Holding humidities constant at Lederle Laboratories Div., Pearl River, New York

Control the quality of air surrounding processes, just as you control materials going into products; this is a rule for quality production at Lederle Laboratories Division, as at the other divisions of American Cyanamid Company. Besides sterilizing the air here, Lectrodryers hold it at a constant temperature and humidity.

You probably have plenty of places where Lectrodryers will help you boost quality and speed production. For help in finding out, write Pittsburgh Lectrodryer Corporation, 325 32nd Street, Pittsburgh 30, Pennsylvania.

LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

LECTRODRYER

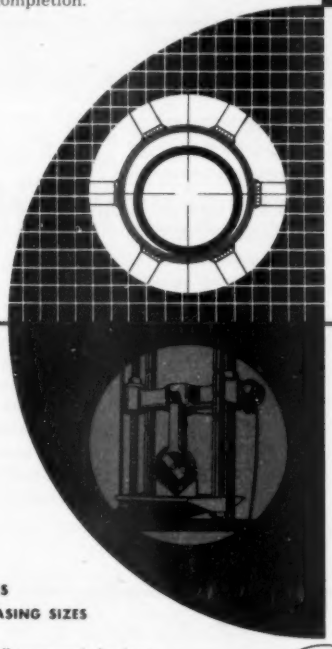
*REGISTERED TRADEMARK U.S. PAT. OFF.

MADE BY WORLD'S MOST EXPERIENCED CEMENTERS

HALLIBURTON'S NEW S-3 CENTRALIZER

Your greatest assurance that you're using the right Centralizer is to know it's made by the world's most experienced cementers – Halliburton.

The skill, research and experience of cementing more than a million jobs have gone into the development engineering of Halliburton's new S-3 Centralizer . . . now ready to give you better casing cementing and more efficient well completion.



POSITIVE CENTERING FORCE WITH LEAST CASING DRAG

Equally effective on rotating or reciprocating casing jobs, the new Halliburton S-3 produces less drag on rotating casing than any other Centralizer on the market today! Torture tested springs of heat-treated steel never touch casing, flatten freely and arrive at destination with positive centering force. These springs are lap welded to rugged, hinge type end bands which allow ample clearance with least drag while rotating. Exclusive Halliburton design permits fewer springs and freer flow in annulus.

TORTURE LOAD TESTED!

Halliburton's big *Baldwin-Southmark* testing machine proves that every S-3 spring has less permanent set, highest effective centering force at any deflection. *Pull in tests* prove conclusively that one size S-3 can be used in all common hole sizes.

For cementing that completely surrounds the casing . . . for free rotation of casing without damage to side walls, get the facts on S-3. Contact your nearby Halliburton representative. Write for FREE BOOKLET containing complete S-3 working information and spacing guide charts for every casing size and hole deviation. Halliburton Oil Well Cementing Co., Duncan, Okla.

THE S-3 CENTRALIZER IS AVAILABLE FOR ALL CASING SIZES

Designed to fit all common hole sizes for any given pipe O.D. They're easily and quickly installed *without* welding while running casing.

YEARS AHEAD IN CEMENTING TECHNIQUE!

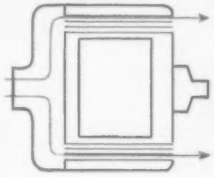
HALLIBURTON

Your *Best* Motor Buy

for Explosion Danger Areas

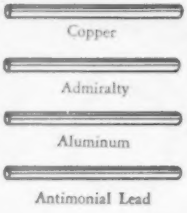
Here's Why

Practically Self-Cleaning



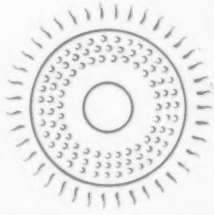
Air-to-air heat exchanger has straight, smooth tubes with no pockets to collect dirt or moisture. Velocity of cooling air through tubes keeps surfaces swept clean. If sticky dirt piles up, tubes can be cleaned quickly with long handled brush.

Choice of Tube Materials



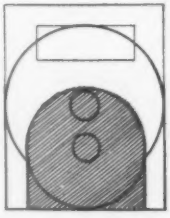
Allis-Chalmers tube-type motors can be built for service in corrosive atmospheres. Tubes may be made of a variety of materials. Motors will carry Underwriters' Label for Class I Group D or Class II Group F or Class II Group G.

Uniform Cooling



Tubes for carrying cooling air are distributed uniformly around the perimeter of the stator and along its full length. Result: heat travels over a short path and the interior is uniformly cooled.

Compact

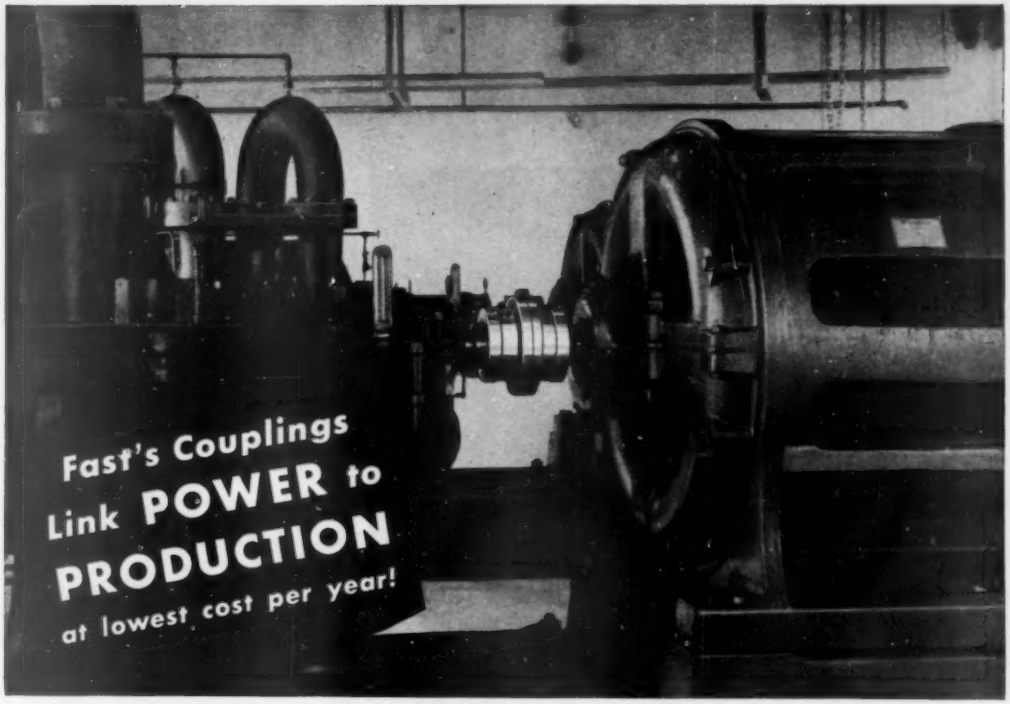


Allis-Chalmers tube-type motors are little or no larger than open motors of the same rating. Internal compartmentation divides motor into two chambers, keeping pressure at a lower level should an internal explosion occur.

Get Complete Information Now — Ask your Allis-Chalmers district office representative about tube-type explosion-proof motors in sizes up to 2000 hp with Underwriters' Labels to 800 hp. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, and ask for Bulletin 51B7149.

A-3768

ALLIS-CHALMERS



FAST'S Couplings usually outlast the equipment they connect!

ACTUAL cases on record show many Fast's Couplings are still in service after as much as 30 years of continuous operation! Time and time again, equipment has been replaced while the original Fast's Couplings remained on the job.

To you, these records of dependable, trouble-free service mean freedom from costly coupling failures when you specify Fast's. And they mean Fast's cost you far less to own and operate . . . because their cost can be amortized over long years of dependable performance.

For full details on how Fast's Couplings and Koppers Engineering Service can help you, write today for a free copy of our catalog to: KOPPERS COMPANY, INC., *Fast's Coupling Dept.,* 286 Scott St., Baltimore 3, Maryland.

Here's How FAST'S Save You Money

Free Service—Koppers free engineering service assures you the right coupling for the job.

Rugged Construction—Fast's still maintains its original design, without basic change or sacrifice in size or materials. Result: freedom from expensive coupling failures.

Lowest Cost per Year—Fast's Couplings usually outlast equipment they connect. Their cost may be spread over many years!

KOPPERS

FAST'S
THE ORIGINAL
GEAR-TYPE
Couplings

INDUSTRY'S STANDARD FOR 32 YEARS

KOPPERS COMPANY, INC., *Fast's Coupling Dept.*, 286 Scott St., Baltimore 3, Md.

Gentlemen: Send me Fast's Catalog which gives detailed descriptions, engineering drawings, capacity tables and photographs.

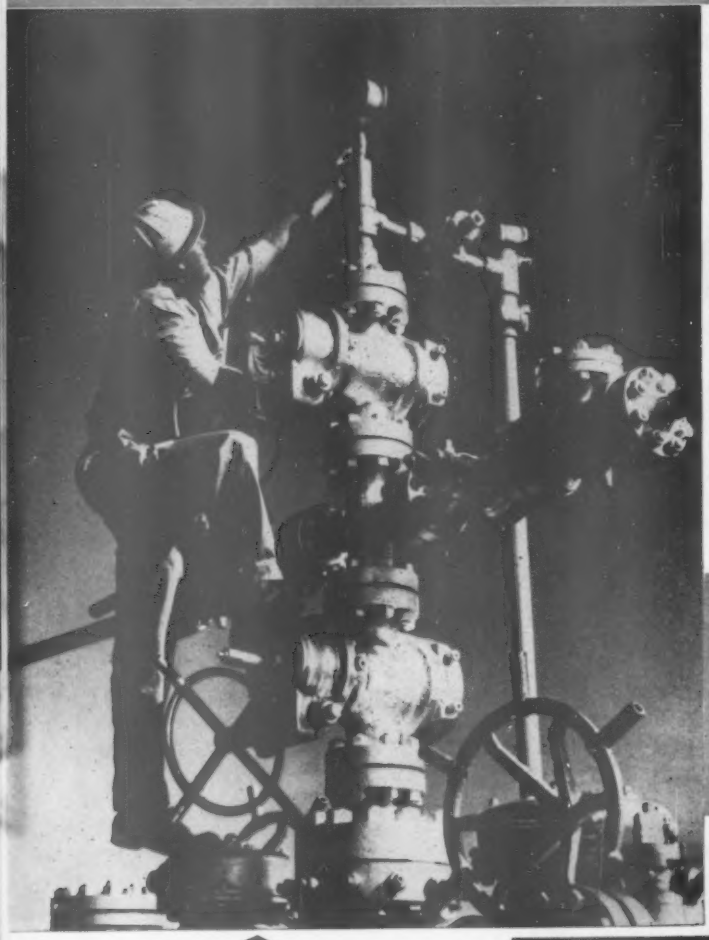
Name .....

Company .....

Address .....

City ..... Zone ..... State .....

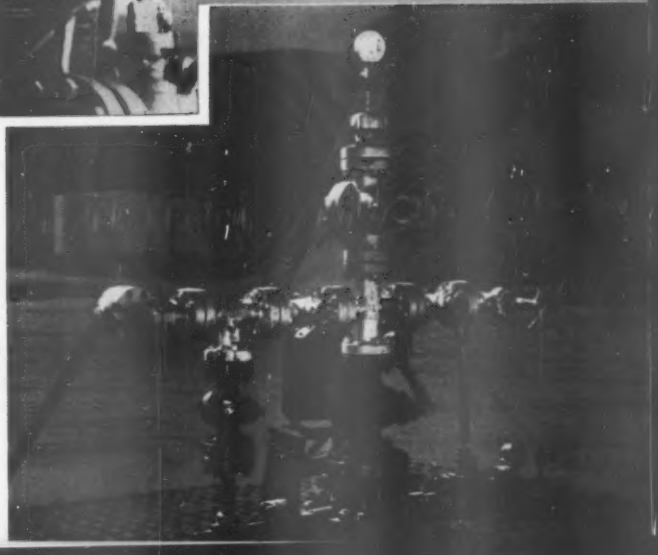
For Christmas Trees Anywhere,
INSTALLATION RECORDS PROVE SUPERIORITY



ANOTHER NORDSTROM TREE
10,000 lb test, injection well, Lovell Lake, Tex.

ANOTHER NORDSTROM TREE
Off-shore tree in Corpus Christi Bay

ANOTHER NORDSTROM TREE
California type tree in Castric area.



Any Design, Any Pressure OF NORDSTROM VALVES

Compact, easy to open, sure to close . . . Nordstrom flow line valves are on christmas trees around the world.

When Nordstrom valves are in the open position, no portion of the contact faces of the valve are exposed to the cutting action of material flowing through the line. Full "Sealdport" lubrication insures double protection against leakage.

The right Nordstrom christmas tree valve has always been available as pressures have increased and tree designs have changed. Today, Nordstrom Hypreseals are on high pressure trees in every production area. Where conditions are corrosive or erosive, Merchrome hard-faced Nordstrom valves meet requirements.

Now Nordstrom has a new bulletin on christmas tree valves. Write for "Trees of Steel," Bulletin V-209. Rockwell Manufacturing Company, 400 North Lexington Avenue, Pittsburgh 8, Pa.

THERE'S A NORDSTROM VALVE FOR EVERY TYPE OF CHRISTMAS TREE

For any tree design, any pressure, any flow conditions Nordstrom builds the *right* valve.

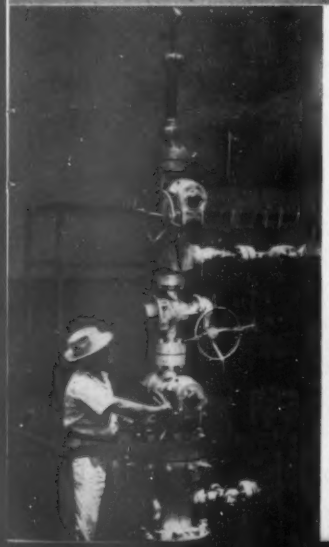
Pressure Classes—API Ratings		Sizes	
500 lb WOG,	1000 lb test	2 inch	2 x 2⅛ inch
1000 lb WOG,	2000 lb test	2½ inch	2½ x 2⅛ inch
1500 lb WOG,	3000 lb test	3 inch	3 x 2⅛ inch
2000 lb WOG,	4000 lb test	4 inch	3 x 3⅛ inch
3000 lb WOG,	6000 lb test	6 inch	4 x 4⅛ inch
5000 lb WOG,	10,000 lb test	8 inch	3⅛ x 2⅛ inch
10,000 lb WOG,	15,000 lb test		4 x 3⅛ inch

Wrench or Worm Gear Operated
EUE—API Line Pipe Threads
Flanges to standard API specifications

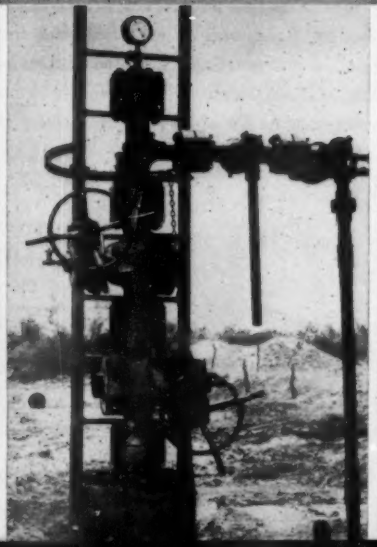
Wherever you are in the oil fields, there's a supply store with Nordstrom valves and Nordstrom service nearby.

Rockwell Built
Another Product
Nordstrom Valves
Lubricant Sealed to Keep Upkeep Down

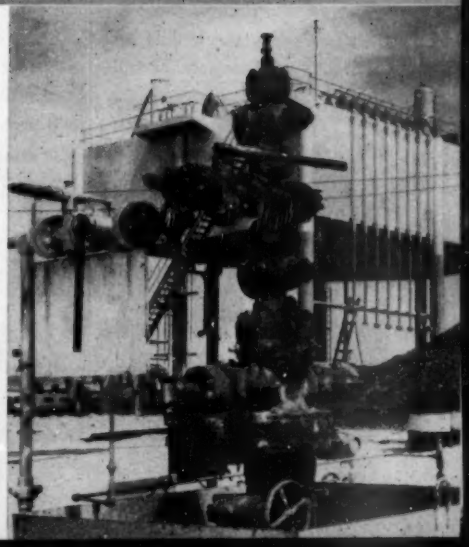
ANOTHER NORDSTROM TREE
15,000 lb test tree, Hampshire, Tex.



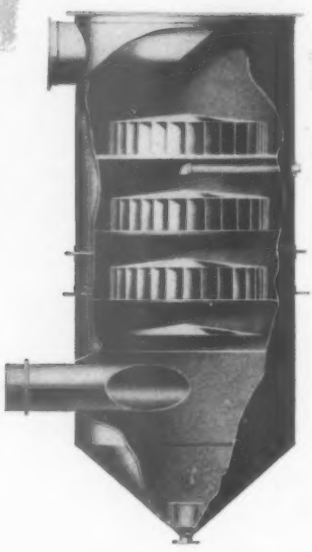
ANOTHER NORDRTROM TREE
15,000 lb test, McMullen County, Texas



ANOTHER NORDSTROM TREE
Coated for protection against Gulf salt air.



Two Years without Maintenance



A dust collector of this design was constructed entirely from 14-gage HASTELLOY *alloy B sheet to resist severe corrosive conditions.*

Handling...

Hydrochloric Acid Vapors
Sulphuric Acid Mist
Nitrous Oxide
Chlorobenzol
Toluol
Aerated Benzol
Aromatic Amides

Three HASTELLOY alloy B dust collectors have just completed 2 years' steady service handling these corrosive chemicals. They are used in a large chemical plant to wash reaction gases and to reclaim many valuable chemicals.

HASTELLOY alloy B has excellent resistance to hydrochloric acid in all concentrations, even to the boiling points. It also has good resistance to sulphuric acid and many other chemicals. The alloy can be fabricated into practically any type of chemical equipment.

For information on the resistance HASTELLOY alloy B has shown to many corrosive media and on fabrication procedures, write for a copy of "HASTELLOY High-Strength, Nickel-Base, Corrosion-Resistant Alloys."

HAYNES TRADE-MARK *alloys*

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
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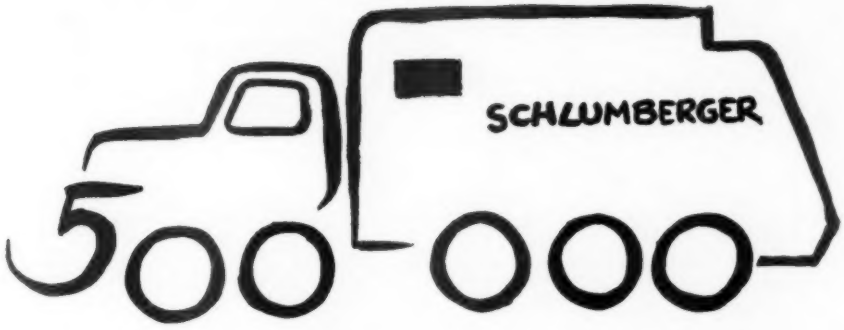
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

"Haynes" and "Hastelloy" are trade-marks of Union Carbide and Carbon Corporation.



500 000 OPERATIONS IN THE USA

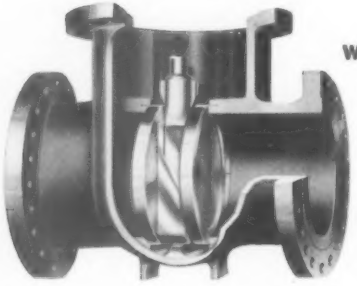
NO SUBSTITUTE FOR EXPERIENCE!

WHY OPERATORS PREFER SCHLUMBERGER!

DARLING VALVES

FOR PLUS VALUES, JOB-PROVED AGAIN AND AGAIN

Above: A pair of Darling 20" cast steel gate valves, equipped with bevel gear and gear case, installed on a major oil line. Because of tight closure and trouble-free performance in general, Darling fully revolving double disc parallel seat valves win favor on line after line.



Cutaway view showing complete simplicity of the Darling fully revolving double disc, parallel seat cast steel gate valve. Just four simple working parts . . . two interchangeable, no-pocket discs and two husky wedges. Maintenance is easy, assembly foolproof. Full seat opening allows free passage of line scrapers.

with Darling revolving double disc parallel seat gate valves

You can count on tight closing!

YOU can't entirely avoid valve body distortion in pipe line service. No matter! Darling's compensating wedge principle *automatically* adjusts for seat misalignment! Moreover, the gate discs, independently hung and free to revolve fully, change their seating position at each closing. This means *uniform* wear distribution. The valves work better and last longer, require less attention, less maintenance! And *you* avoid headaches.

SEND FOR DATA

Darling fully revolving double disc gate valves come in a wide range of types and sizes for main line, gathering, manifold, tank farm and all other gas and oil line services. Outline your particular service needs or ask for complete descriptive bulletin.

DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ontario

The A. O. Smith Welder

"Cash for a Name" CONTEST

$300.00 FIRST PRIZE

$200.00 Second Prize

$100.00 Third Prize

Name this New Gas Engine-driven Welder

Suggest a name for this precision-built, mobile, gas engine-driven field welder. The name should suggest that it is the best self-contained and mobile welding machine in the welding industry.

The best name, in accordance with the rules, will win you $300.00 in cash! Second and third place winners will receive $200.00 and $100.00 respectively.

Study the specifications below. Think of a name that describes ruggedness, stamina and endurance. Remember that this welder is easy to maintain and service because component parts are conveniently accessible. It starts with a quick surge of power and provides a smooth, forceful arc. It's THE welder for all kinds of welding jobs in the field; for pipeline, maintenance and construction jobs.

HERE IT IS!

Specifications

200 amperes, 40 volts, N.E.M.A. Rated. Step-type welding current control, continuous voltage control.

110 volts, 2½ kilowatts auxiliary power.

Liquid-cooled industrial Engine, 1800 rpm. with magneto ignition, automatic idle control and dual manual control.

Skid-mounted. Two- or four-wheel trailer available.

Available with or without instruments, self starter, hoods for complete enclosure.

Exciter is readily accessible.

Weight, approx. 1212 pounds.

Contest Rules

1. This is a naming contest starting June 1, 1952 and ending at midnight July 12, 1952. Contestants are to submit names which, in the opinion of the judges, are appropriate for the new A. O. Smith Gas Engine-driven D.C. Welder described. Each name must be submitted on a separate piece of paper or the coupon from this advertisement together with a brief supporting statement and the legibly written name and address of the contestant. Writing ability will have no bearing on the contest.

2. The three names selected by the judges as best shall be declared the winners of first, second and third prizes respectively. In the event identical names are submitted by different contestants, the ideas contained in the brief supporting statements shall be considered by the judges in selecting prize winners.

3. This is a nationwide contest and is open to readers of this publication and others who use welding equipment, except employees of A. O. Smith Corporation and its advertising agency, and members of their families.

4. In the case of ties, duplicate prizes will be awarded.

5. Winners will be notified by mail, individually. Winners' names will be announced in the September issue of this publication in an advertisement on this new gas engine driven-welder.

6. The decision of the judges will be final. No entries will be returned but will become the property of A. O. Smith Corporation.

7. All entries must be postmarked before midnight of July 12, 1952 and mailed to A. O. Smith Corporation, Welding Products Division, Milwaukee 1, Wisconsin.

8. Entries will be judged by executives of Henri, Hurst & McDonald, Inc., advertising agency.

A. O. Smith 78th ANNIVERSARY 1874 - 1952

A.O.Smith
WELDING PRODUCTS

Made by Welders . . . for Welders

THIS COUPON MAY BE WORTH $300.00 IN CASH TO YOU!

A. O. Smith Corporation
Welding Products Division, Dept. OG-652
Milwaukee 1, Wisconsin

I offer the following name (and supporting statement) as my entry in your new gas engine-driven welder naming contest:

_____

(write the name you suggest on this line; write supporting statement on margin of this page)

Name _____

Firm _____

Address _____

City _____ Zone _____ State _____

NATIONAL
IDEAL

Reduce Drilling Expense with

SPANGWELD
DRILL PIPE

Produced under the complete control of one manufacturer—from steel billet to final tool joint weld—Spangweld Drill Pipe was developed with the double intent of reducing the initial cost as well as the operating cost of drilling strings.

The major features of Spangweld Drill Pipe include—

- **Tool joints flash-welded to drill pipe**
- **Threaded elements reduced to one-third the number in conventional drill pipe and tool joint strings**
- **Streamlined exterior contour**
- **Pipe and joint combinations in a complete range of internal and external diameters for every drilling requirement.**

SPANG-CHALFANT DIVISION

THE NATIONAL SUPPLY COMPANY

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NATIONAL OIL FIELD MACHINERY AND EQUIPMENT
SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

NATIONAL BLUE PRODUCTS

greater EFFICIENCY on Wilson atlas rigs

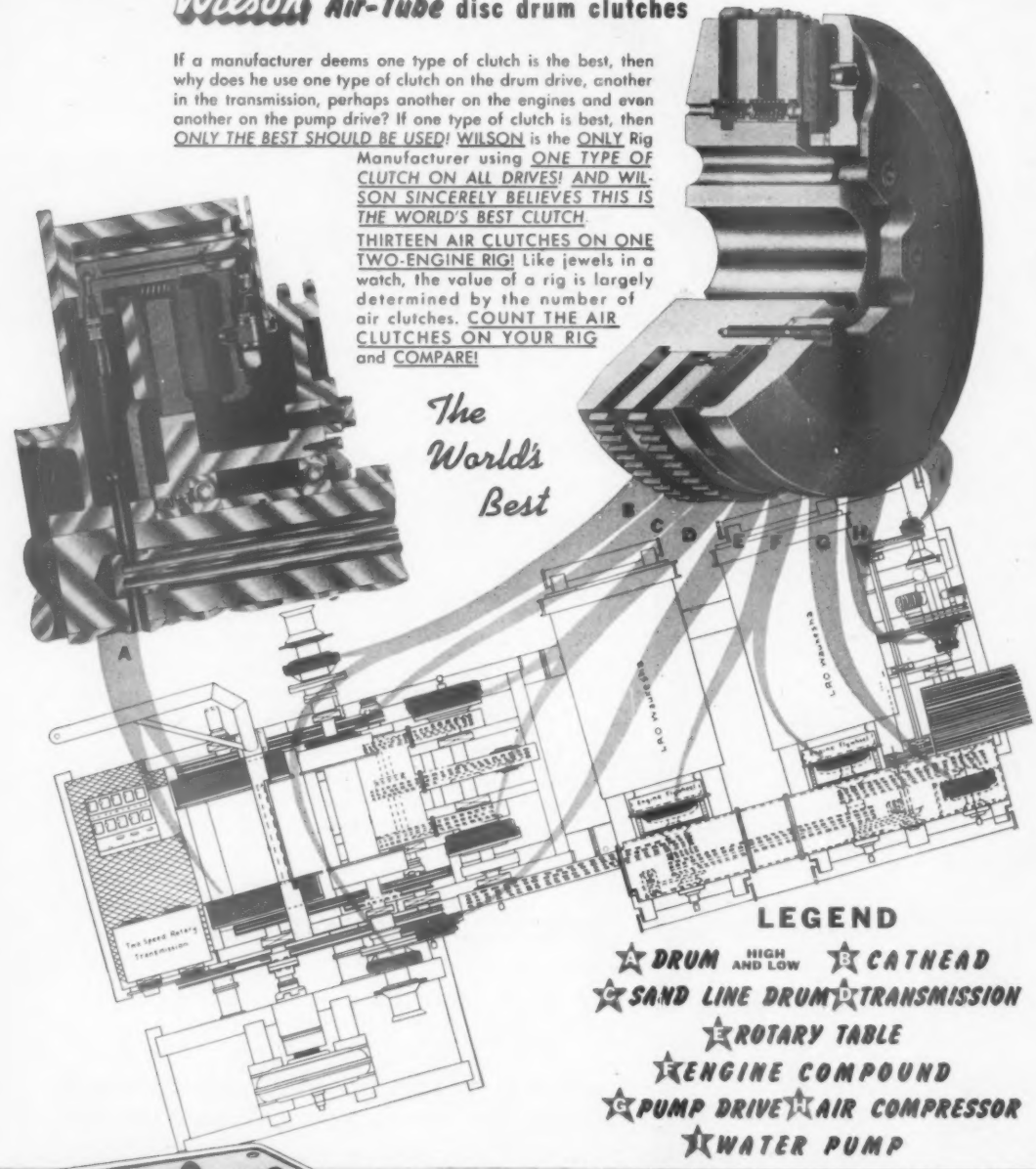
with... **WICHITA Air-Tube disc clutches**

Wilson Air-Tube disc drum clutches

If a manufacturer deems one type of clutch is the best, then why does he use one type of clutch on the drum drive, another in the transmission, perhaps another on the engines and even another on the pump drive? If one type of clutch is best, then *ONLY THE BEST SHOULD BE USED!* WILSON is the ONLY Rig Manufacturer using *ONE TYPE OF CLUTCH ON ALL DRIVES! AND WILSON SINCERELY BELIEVES THIS IS THE WORLD'S BEST CLUTCH.*

THIRTEEN AIR CLUTCHES ON ONE TWO-ENGINE RIG! Like jewels in a watch, the value of a rig is largely determined by the number of air clutches. COUNT THE AIR CLUTCHES ON YOUR RIG and COMPARE!

The World's Best



LEGEND

- A DRUM HIGH AND LOW
- B CATHEAD
- C SAND LINE DRUM
- D TRANSMISSION
- E ROTARY TABLE
- F ENGINE COMPOUND
- G PUMP DRIVE
- H AIR COMPRESSOR
- I WATER PUMP

Wilson MANUFACTURING CO., Inc.

WICHITA FALLS, TEXAS

ALUMINUM MONEL* BRASS STEEL

NEED METALS?

INCONEL* STAINLESS STEEL NICKEL* COPPER

Sheet, Plate, Tube, Pipe, Wire, Rod and Bar, Extrusions, Structural Shapes .. and the following INDUSTRIAL PRODUCTS: Fasteners, Tube Fittings, Pipe Fittings, Valves, Silver Brazing Alloy, Welding Material, Solder, Castings, Tube Expander Equipment, Liquid Plastic Protective Coating, Metallic Caulking Compound, Aluminum Metal Trim, Waterproof Barriers, Nails, Handrail Fittings, Low Melting Alloys, Aluminum Jacketing, Wire Cloth and Rope, and "O" Rings.

Precision Equipment for Shearing and Slitting.

*Not stocked in Kansas City or St. Louis territories.

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Fred Greer
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Built as you want them!

GENERAL PURPOSE

HANCOCK GATE

STEEL

WELDVALVES

General Purpose Hancock Steel Gate Weldvalves are priced in line with ordinary valves. Yet, built into them are exclusive design and operating features that assure extra years of trouble-free dependability and long-life economy in the severest services. For example, every one of these rugged valves gives you these advantages:

1. Maximum use of super-strong, leak-proof welding.
2. Integral Stellite seats.
3. "500 Brinell" stainless steel wedges.
4. No galling because dissimilar materials are used for the accurately finished and perfectly aligned seats and wedges.
5. No stem pitting.
6. Corrosion-resisting back seating.
7. Extra-strong upper structure.
8. Repacking ease.
9. Safe, comfortable handwheel — designed to operator specifications.
10. Complete interchangeability of parts that saves time, trouble, money.
11. Baked enamel exterior finish for maximum protection.

800# Hancock Gate Steel Weldvalves are made in bolted bonnet and in "no bonnet joint" designs for *all* pressures up to 800 P.S.I. at 750°F. — O.W.G. 2000# 100°F. *Sizes:* ¼" through 2" in no bonnet joint design; 1¼" through 2" in bolted bonnet design. *Connections:* screwed ends . . . socket weld ends . . . flanged ends.

Your nearby Hancock Valve Distributor will gladly give you complete information about the type of Steel Gate Weldvalve you like best. Phone him for fast, efficient service.

1877 HANCOCK U.S.A.

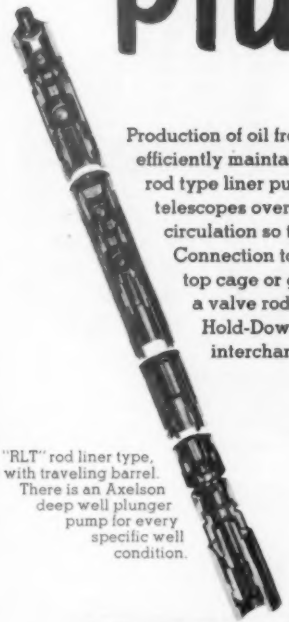
When Hancocks go in, valve costs go down

HANCOCK VALVES

A product of MANNING, MAXWELL & MOORE, INC. WATERTOWN 72, MASSACHUSETTS

MAKERS OF 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS. BUILDERS OF "SHAW-BOX" CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

"You can't beat an Axelson Deep Well Plunger Pump"



"RLT" rod liner type, with traveling barrel. There is an Axelson deep well plunger pump for every specific well condition.

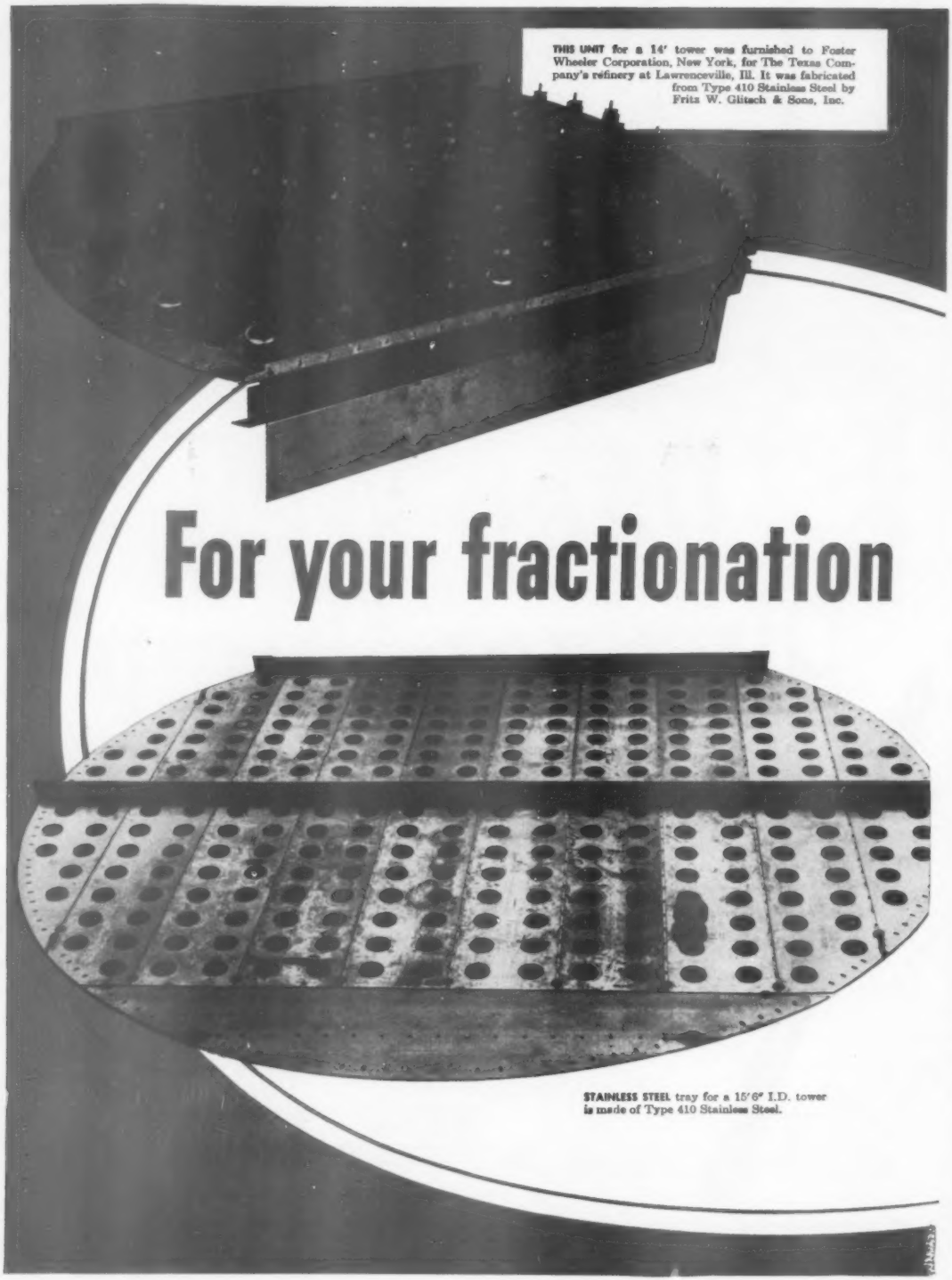
Production of oil from wells having sandy conditions is efficiently maintained by the use of Axelson traveling barrel rod type liner pumps. The external barrel assembly telescopes over the plunger unit, keeping the fluid in constant circulation so that hazards of sanding up are minimized. Connection to the sucker rod string is made directly to the top cage or guide coupling, eliminating the necessity of a valve rod. The Axelson Bottom-Lock Mechanical Hold-Down conforms to API specifications. All parts are interchangeable. **Chosen first . . . to last!**

AXELSON
PETROLEUM PUMPING EQUIPMENT

OUR 60th YEAR

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

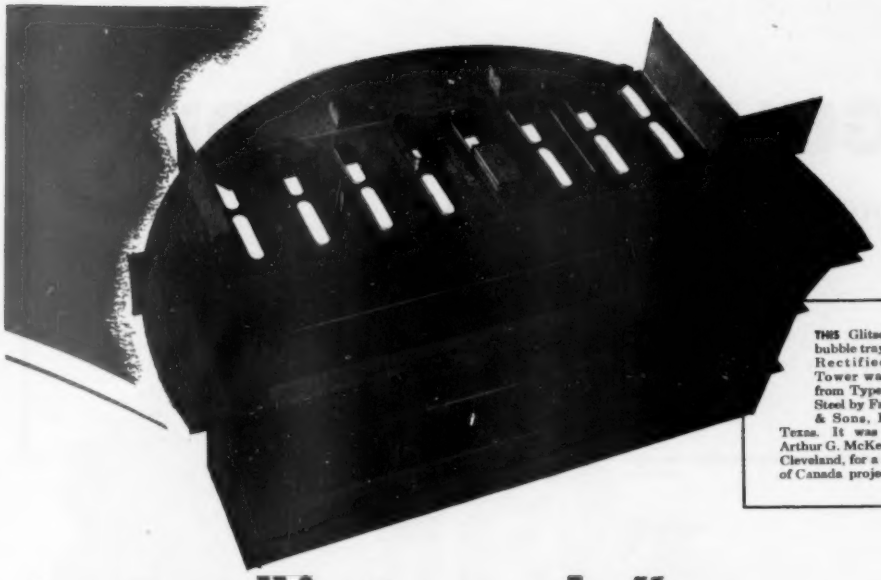
AXELSON MANUFACTURING CO. • PLANTS—Los Angeles 58, Calif.; St. Louis 16, Missouri. OFFICES—New York City 7, New York; Tulsa 1, Oklahoma; Buenos Aires, Argentina. DISTRIBUTORS — Jones & Laughlin Supply Co.; Great Northern Tool & Supply Co.; Industrial Agencies, Ltd., San Fernando, Trinidad, B. W. I.; Industrias Waldrip & Campbell, Barcelona, Caracas and Maracaibo, Venezuela; South American Supply Co., Ltd., Lima, Peru; Sociedad Comercial de Materias Primas Limitado, Rio de Janeiro, Brazil; G. Saavedra e Hijos, S. de R. L. Avenida Morelos 31, Mexico, D. F.; Dominion Oil Field Supply Co., Ltd., Calgary, Canada.



THIS UNIT for a 14' tower was furnished to Foster Wheeler Corporation, New York, for The Texas Company's refinery at Lawrenceville, Ill. It was fabricated from Type 410 Stainless Steel by Fritz W. Glitsch & Sons, Inc.

For your fractionation

STAINLESS STEEL tray for a 15'6" I.D. tower is made of Type 410 Stainless Steel.



THIS Glitsch truss-type bubble tray for a 6'6" I.D. Rectified Absorber Tower was fabricated from Type 410 Stainless Steel by Fritz W. Glitsch & Sons, Inc., Dallas, Texas. It was furnished to Arthur G. McKee & Company, Cleveland, for a Shell Oil Co. of Canada project.

tower "internals" take advantage of available U·S·S 12 Stainless Steel

(no CMP tickets needed)

USED in bubble caps, trays, weirs, risers, floors, trusses, major beams, uptakes and downcomers, U·S·S 12 (Type 410) Stainless Steel offers maximum corrosion resistance for your money. At the same time, use of this available straight-chromium grade helps conserve the supply of nickel-bearing Stainless Steels.

Type 410 Stainless Steel has a long history of satisfactory service in these types of applications. As long as ten years ago, more than 500 sets of bubble caps and trays fabricated from Type 410 were in use and giving highly satisfactory service.

One fabricator who has used Type 410 Stainless extensively since 1938 finds it has a life 6 to 7 times that of carbon steel under normal operating conditions.

This grade of Stainless Steel has excellent resistance to the corrosive conditions encountered in fractionation towers. And it resists the effect of temperatures encountered in this type of operation—as high as 1000°F.

Stainless Steel's dense, smooth surface prevents coking and fouling, thus permitting longer runs with less down time for cleaning. Its strength and toughness mean less breakage and less wasted tray area. Because of its high corrosion resistance and its formability, thinner sections can be used and one-piece bubble caps, risers, etc. can be made. Together, this makes possible longer life and lighter weight units.

U·S·S 12 Stainless Steel—a service-tested material—will give you unmatched performance in these internal parts. Specify it to your fabricator; he needs no CMP tickets for any form of this material.

UNITED STATES STEEL COMPANY, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

USS

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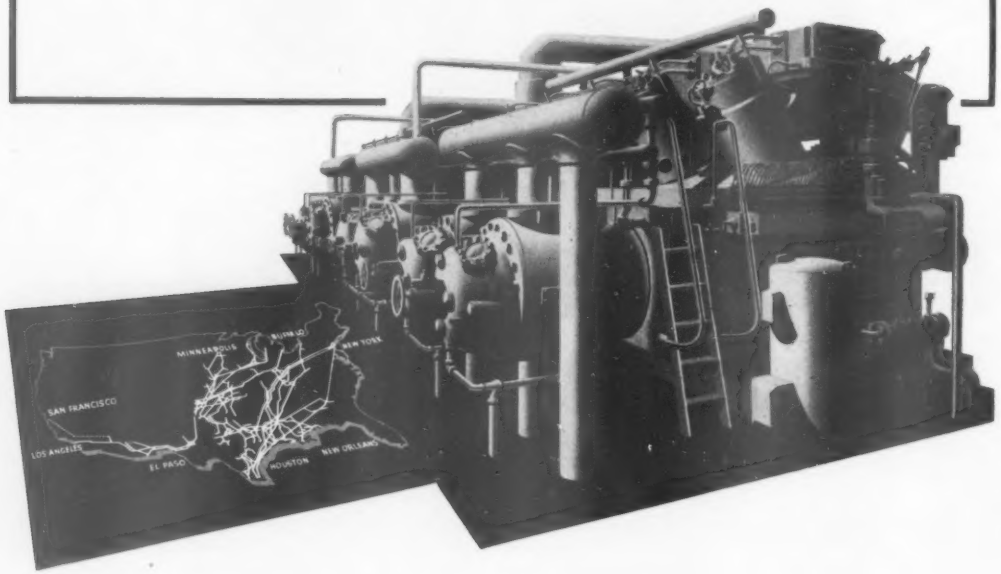
D-385

UNITED STATES STEEL

GULF SECURITY OIL

provides better lubrication
for pipe line compressor units,
helps prevent operating troubles



Here's the lubricant you can depend on to help keep your pumping stations operating smoothly and continuously—Gulf Security Oil. It provides effective protection for cylinders and bearings in both engines and compressors.

Because of its excellent resistance to oxidation, Gulf Security Oil stands up for many hundreds of hours without any appreciable change in its original properties. After years of operation with this quality lubricant, equipment shows remarkable freedom from cylinder wear and a minimum of carbon deposits on valves and rings. And because oil control rings are kept clean, oil consumption is remarkably low.

Operators of the many units lubricated with Gulf Security Oil report that this quality lubricant helps them get more operating hours between overhauls, and avoid unscheduled shutdowns.

For additional information on Gulf Security Oil and for the services of a Gulf Lubrication Engineer, get in touch with your nearest Gulf office today. Write, wire, or phone.

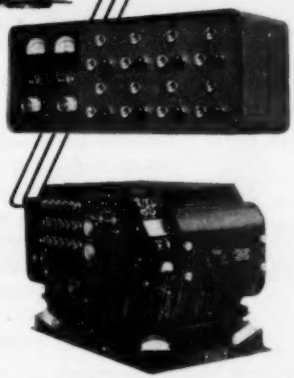
Gulf Oil Corporation · Gulf Refining Company,
Gulf Building, Pittsburgh 30, Pennsylvania.

GULF INDUSTRIAL LUBRICATION

No doubt about this mast when it went to market . . .

Raising a 35-ton mast of structural steel from horizontal to full vertical position is a problem in itself. Being certain that, once raised, the 143-ft.-high structure is able to support the tremendous weight of a string of drill pipe is still another problem. Add to these requirements the ability of the mast to be skidded across oil-field terrain, and you have a structural engineer's nightmare.

IDECO, in designing their "Full-View" drilling mast, had to know the complete stress and strain story of this structure. By using Consolidated Dynamic Recording Equipment—strain gages, bridge balance, and recording oscillograph—a complete stress analysis was made while the mast was being raised or lowered, or was standing vertically under a simulated pipe load. Thus the engineers removed any trace of doubt from the mast design. Consolidated's broad experience in applying instrumentation to design and production problems may be profitable to your business.



Consolidated Engineering

CORPORATION

300 No. Sierra Madre Villa, Pasadena 8, California

Analytical Instruments for Science and Industry

Recording Oscillograph

The 5-114 Recording Oscillograph records up to 18 simultaneous reactions as brief as one-hundred-millionth of a second. Produces clear, permanent records for future analysis. Applications vary from the field of medicine to rocket-propelled planes. Write for Bulletin 1500B.

SETTLE YOUR *Treating Problems* WITH PARKERSBURG

● The most important step in settling emulsion treating problems is selecting the proper size and type of equipment. And the two most important factors controlling selection of the right treater are heating capacity required and quiet settling time allowed a given volume of oil.

Using this proven formula, Parkersburg offers 8 different types of treaters in a total of 32 sizes. From this wide range of emulsion treaters, Parkersburg can recommend exactly the treater required to meet the production characteristics of any given well. Ask your Parkersburg Representative about the size and type to meet your treating problem.

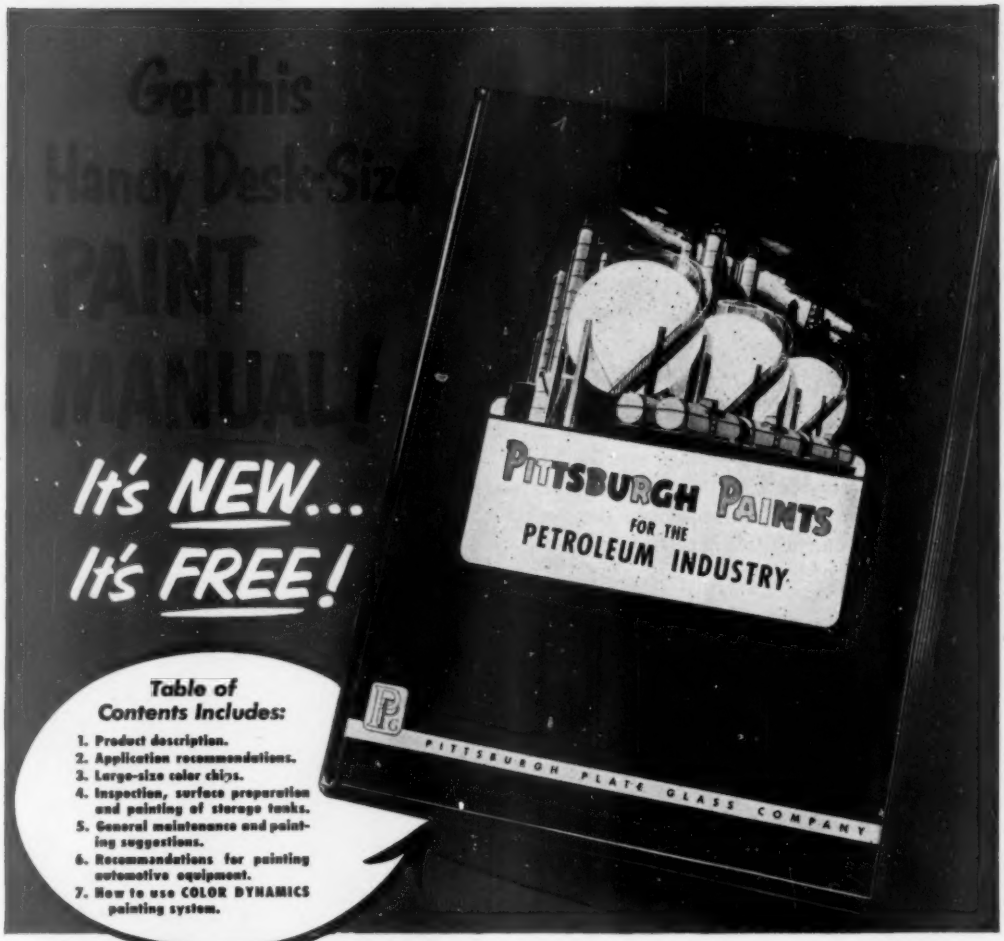
THE PARKERSBURG RIG & REEL COMPANY
Parkersburg, West Va.

No. 5119

PARKERSBURG
PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston, Texas



PITTSBURGH has just issued a highly practical manual of information for those who buy and use paints in the petroleum industry.

● **This ready reference volume** contains complete descriptions of all Pittsburgh Paints for this field. These finishes are the finest it is possible to make. Their formulations are the result of the latest and best knowledge developed by Pittsburgh's large and skilled technical staff. Among its advancements are special *"Vitolized Oils"* and the process of molecular selection which have contributed so much to the exceptionally high-level performance of these coatings.

● **Also included** in this manual are numerous suggestions for proper application and maintenance. Many of these have been derived from Pittsburgh's long experience in supplying leading petroleum producers with high-quality finishes that have proved to be unusually successful in beautifying and preserving many types of surfaces.

● **By keeping this manual** handy you may be able to save time and money. We'll be glad to send you a copy without cost or obligation. Just fill out and mail coupon below, with one of your company's letterheads.

PITTSBURGH PLATE GLASS CO., Industrial Paint Div., Pittsburgh, Pa. Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Atlanta, Ga.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Div., Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Div., Cleveland, Ohio. M. B. Suydam Div., Pittsburgh, Pa.

Send this Coupon For Your Copy TODAY

Pittsburgh Plate Glass Company,
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Pittsburgh, Pa.7

Please mail me copy of your handy reference manual, "Pittsburgh Paints for the Petroleum Industry."

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MODERN PIPE *for* *Modern Service Requirements*

MODERN USAGE is continually making increasingly severe demands on pipe lines. They must do much more than merely resist corrosion. They must convey greater volumes, at higher internal pressures; they must withstand vastly increased external loadings; they must be adapted to an ever-widening range of service conditions. Mono-Cast Pipe possesses the exceptional physical strength and uniformity necessary to meet these requirements.

Mono-Cast pipe is manufactured in diameters 3-inch through 48-inch. It is conveying gas, crude oil, gasoline, sour naphtha, salt brine, Foamite fire foam, ashes, water—and in fact, just about everything that a pipe line can conceivably convey. It is conveying these products under operating pressures ranging from a few pounds to the square inch, up to pressures in excess of 100 pounds gas and 500 pounds liquid.

Among the joints available are Mono-Cast Double-X, Bell and Spigot, Roll-On Joint, Screw-Gland and Flanged. These joints and a full line of standard accessory fittings make it easy to install under varying service and laying conditions.

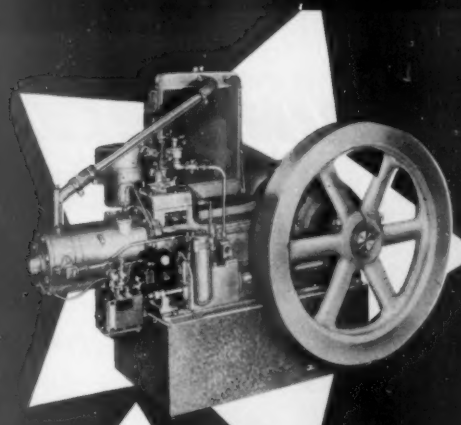
Write for free literature, stating the kind of joint in which you are interested. Address the ACIPCO office nearest you.

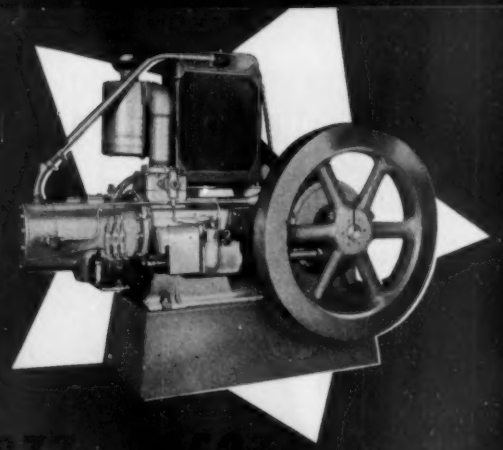
Mono-Cast Pipe serves equally well beneath crowded city streets or in cross country installations. View above shows 30" Mono-Cast Double-X Pipe being installed for natural gas service in Chicago, Illinois.

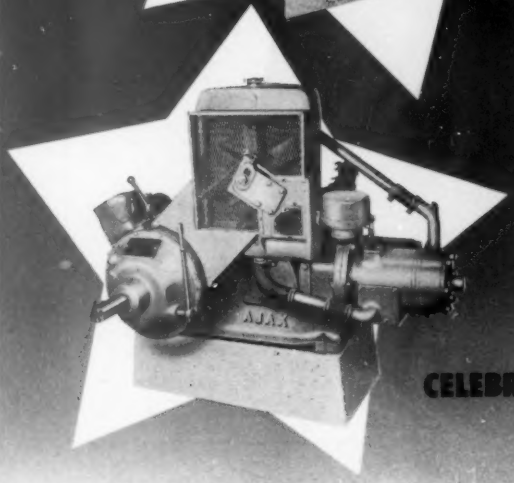
AMERICAN CAST IRON PIPE COMPANY

Birmingham 2, Alabama

Dallas Houston El Paso Pittsburgh Kansas City New York City
Chicago Minneapolis Cleveland Los Angeles San Francisco Seattle







Ajax

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OF ENGINE PRODUCTION FOR THE OIL INDUSTRY

with the finest
GAS ENGINES ever built

Three-quarters of a century devoted to building engines that satisfy the most exacting customers in the world—the American oil producers—have placed Ajax in a position of leadership imposing accepted obligations for continued steady progress. ● You'll find today's Ajax Gas and Oil Engines the finest ever built. *Let your Supply Man give you the facts!*

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AJAX IRON WORKS

Manufacturers of Gas Engines • Steam Drilling Engines • Industrial Steam Engines

CORRY, PENNSYLVANIA

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R. B. MOORE SUPPLY CO., INC., BOLIVAR, N. Y. • BETHLEHEM SUPPLY CO., TULSA, OKLA.

Only an HCR **FLOWLINE VALVE**

can match your QRC **IN DEPENDABLE, SAFE PERFORMANCE**

A fast-closing pressure-operated gate valve on the flowline can spell the difference between a successful drilling operation and a disastrous wild well. The Cameron HCR (High Closing Ratio) Flowline Gate Valve employs the same proven pressure-operating mechanism as the famous Cameron Type QRC Blowout Preventer, and provides the same high ratio of closing pressure to well pressure, i.e., 1000 lbs. operating pressure will close it against approximately 8000 lbs. well pressure. The ratio of opening pressure to well pressure is 4 to 1, so that the valve may be easily *opened* under high well pressure should it become necessary to relieve pressure through the flowline.

SELLING THROUGH SUPPLY STORES

Cameron

Most name in Valves and Controls

CAMERON IRON WORKS, INC., Houston, Texas

Export Office: 74 Trinity Place, New York, N. Y. ● Sterling Area: British Oil Field Equipment Co., Ltd., Duke's Court, St. James's, London S.W.1. England ● California: Cameron Iron Works of California, Box 267, Long Beach ● Canada: Cameron Iron Works of Canada, Ltd., 9860-88th Ave., Suite 3, Edmonton, Alberta.

PETROLEUM CHEMICALS DIVISION
NEWS

June ★ One of a Series of Interest to the Petroleum Industry ★ 1952

CAPITALIST!

Johnny used to be a laborer. Tim still is. Both cut lawns. Both used to use customers' hand mowers. Each could do one big lawn a day for $2.

Tim spent his $2 on movies and candy. Johnny saved some money, borrowed some more, and bought a power mower. Now he can cut 5 lawns a day, and so makes $10. He puts aside $2 a day to pay back his loan, and $1 toward another mower when this one wears out.

He still has $7 where he used to have two, and is helping more people get their lawns cut when they want them. Yet some enemies of business say this shows that Johnny is too big; that he should be limited in the number of people he can serve.

And they would prevent him from setting aside the $1 a day needed to assure continuing customer service. They would even like to force Johnny to share his $7 with Tim—so Tim could enjoy more movies and candy.

Ridiculous? Yes . . . but these same charges and demands are being leveled at *your* business today.

Dr. Rankin Stresses Importance of Safety to Refinery Workers

In a refinery—especially the tetraethyl lead blending area—safety is an important factor contributing to high production efficiency, uniform quality standards and good employee relations.

What's more, "*Safety is a way of life*," says Dr. Stewart L. Rankin, chief medical advisor to the Du Pont Petroleum Chemicals Division. And Dr. Rankin drives that point home—forcefully and eloquently—to hundreds of refinery workers every month.

Dr. Rankin is a physician by profession and a safety man by avocation. This combination lends weight to the points he makes and interest to his presentations. As a result, he is in constant demand for safety talks before refinery groups.

In 1951, he spoke to 36 groups ranging in size from 15 to 200 people. In 1952, his schedule is even more active and one large group of 400 has already heard his talk.

"The habit of safety," says Dr. Rankin, "has to be practiced when people are on their own; when they are on the job; when driving their car. Such a habit is an individual and personal matter. It is a prescription that is good medicine, and, in this case, the medicine *is* habit forming.

"If people, individually, make a real effort to keep the monster, personal injury, under control, then an important hazard will have been outlawed in American industry."

With this philosophy, Dr. Rankin is constantly stimulating refinery workers to maintain and improve their already high records of industrial safety.

Joseph L. Stecher Responsible for Success of Many TEL Manufacturing Techniques

Back in the early 20's, the beneficial effects of tetraethyl lead as an antiknock agent in gasoline were known to petroleum and automotive engineers. But the product was not yet available in commercial quantities.

Being highly toxic, it presented a difficult as well as hazardous manufacturing problem. When the Du Pont Company was called in, the responsibility for producing and delivering TEL on a commercial scale was assigned to Joseph L. Stecher, a young Du Pont engineer.

JOSEPH L. STECHER—Today, wherever TEL is made, in this country or abroad, it is produced according to the basic engineering process first set up by Joseph L. Stecher and his associates.

With skill, energy and determination, and working with other Du Pont engineers and scientists, Mr. Stecher absorbed the research data and molded it into a practical, large-scale production venture.

OVER

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

PETROLEUM CHEMICALS DIVISION
NEWS

CONTINUED *Stecher*

One of his outstanding accomplishments was building the entire Chambers Works tetraethyl lead B unit in *only 90 days* . . . with details of the construction worked out in his head. In order to get the unit into production with such speed, he later admitted that the blueprints for the job had been drawn after work had been completed.

Utilizing his first design and plans, Mr. Stecher also supervised the construction of three other producing units in the Du Pont Chambers Works TEL area. Later he was placed in charge of the design and construction of the Baton Rouge tetraethyl lead plant.

DESIGNED UNIQUE FEATURES

Many of the engineering and safety features incorporated by Mr. Stecher and his aids in the original design for TEL manufacturing plants were unique and highly advanced for their day. Yet, they have stood the test of time and are still as safe, as practical and as efficient as in 1923.

The safety procedures and regulations set up by Mr. Stecher in 1923, in many cases, are also still the accepted standards for the industry and continue to meet the most rigid health specifications. In addition, Mr. Stecher and his associates were responsible for the modern features which distinguish the operating equipment and auxiliary facilities of Du Pont's TEL manufacturing plants today.

To the refiner, fast, safe deliveries of TEL are just as important as its manufacture, and Mr. Stecher, with the help of the Chambers Works engineering group, developed the safe handling methods for TEL in railroad tank cars.

Throughout his career, Mr. Stecher has actively contributed to the production and distribution of tetraethyl lead antiknock compounds . . . as supervisor of manufacturing, as manager of the Du Pont Tetraethyl Lead Division, and as assistant director of sales for the Petroleum Chemicals Division.

No wonder so many of his associates refer to Du Pont's Joseph L. Stecher as *"Mr. TEL"!*

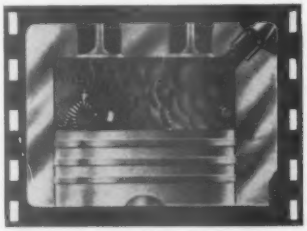
"Pipeline" Wins Award

The Du Pont Petroleum Chemicals Division motion picture "Pipeline on Wheels" has been selected as a co-winner of top honors by the National Committee of Films for Safety in one of its 4 classifications of non-theatrical safety films produced in 1951.

Sound-Slide Film on Gasoline Quality Available to Marketers

Marketers who are interested in visual training aids to improve dealer salesmanship can now take advantage of a new Du Pont sound-slide film presentation.

Adapted from the Du Pont movie, "What Makes a Gasoline Good," this full-color slide film tells the story of how gasoline is made. It's packed with helpful information and concrete selling points, too.



THE ENTERTAINING slide film cartoons show graphically what goes on in a combustion chamber . . . what causes knock . . . and how your high quality gasoline prevents it.

A standardized film strip can be supplied to refiners—free of charge—with personalized beginning and concluding frames bearing their own trade-mark, showing their own stations or pumps, or any other individualized scene. There is no reference to the Du Pont Company anywhere in the film or script.

In cases where it is desirable to amplify the standardized version, the whole presentation can be tailored to suit individual requirements — by inserting any number of slides relating to the refiner's own gasoline brand and special promotions. Even for the personalized versions, the cost is under $5 per print if ordered in quantities of 100 or more.

A sound recording of the script is supplied with the standard version. Where the film is individualized, the recording can generally best be made by the oil company itself. In the latter case, the speaker's delivery can be in keeping with the speech mannerisms of the local marketing area.

CONVENIENT, EASY TO USE

The film is ideal for showing to small groups in the service station. The only requirement is a standard slide film projector which can be conveniently carried in a salesman's car. The equipment can be easily set up on a desk, and anyone can operate it. The running time is only 10 minutes.

To make the message doubly penetrating, give-away cartoon books — retelling the story on the film — can be passed out at each showing. These, imprinted with the refiner's brand or company name, are also available from Du Pont. In small quantities, these are free. A nominal charge is made for the books in lots of 1000 or more.

MANY USES

In addition to dealer education, this Du Pont slide film is ideal for sales promotion work with customer groups, schools and civic organizations.

If you are interested in having one of these slide films made up for your own marketing group, ask your Du Pont Petroleum Chemicals Division representative for full details.

MOVIES AVAILABLE

The following Du Pont films may be borrowed or purchased by oil companies. Address your request to the nearest Petroleum Chemicals Division district office.

Pipeline on Wheels—A 26-minute, full-color movie on tank truck safety. Suitable for both training and public relations purposes.

What Makes a Gasoline Good—An 18-minute cartoon movie in color. Presents, in easy-to-understand form, the story of how high quality gasoline is made. Ideal for dealer training meetings.

DU PONT
REG. U.S. PAT. OFF.
Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

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Petroleum Chemicals Division • Wilmington 98, Delaware

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ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

A-3547

Printed in U. S. A.

They Say—

Appeal for Education

"Federal subsidies to educational institutions must be avoided to avoid centralized, bureaucratic control of teaching and research. But if people do not give adequate support individually, the federal Government may step into the vacuum.

"The choice is before us—and it should not be made by default."

Dr. L. A. DuBridge, president, California Institute of Technology, addressing A.P.I. Division of Refining, San Francisco.

Robbery, But by Whom?

"Mr. Truman's veto of the tidelands bill will probably hold. Twenty-seven of the 48 states do not touch the sea, and it is doubtful if enough Congressmen will have a direct interest in overriding the President's veto.

"What is most interesting, however, is the state of mind of Mr. Truman and the big government boys. They move to seize a rich area that has been traditionally considered the property of the several states. The affected states seek legislation to nail down their property. 'Robbery,' cries the President, and the 'liberals' cheer."

Editorial in the Tulsa Tribune.

Shift in Distribution

"In 1951 we find that 37 per cent of our oil moved to the United States, 8 per cent to Canada, and 28 per cent to Central and South American markets. Thus 73 per cent of our crude and products remained in the Western Hemisphere. Various countries in Europe, Africa and the rest of the Eastern Hemisphere received 22 per cent of our oil, while another 5 per cent was delivered to the armed forces and others.

"A comparison of 1951 figures relating to the destination of our crude oil and other products with those for previous years indicates some interesting trends. Crude oil and products moving to Western Hemisphere destinations was 53 per cent in 1939, the last representative pre-war year, 68 per cent in 1947, the immediate post-war year, and 73 per cent in 1951.

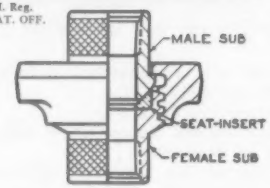
"On the other hand, our crude oil and products moving to the Eastern Hemisphere was 41 per cent in 1939, 28 per cent in 1947 and 22 per cent in 1951. Percentages do not tell the whole story, however, since our production

NEW
EASIER
CHEAPER
QUICKLY
INSTALLED
S-I-W PARAFFIN SCRAPER
EASY TO INSTALL
CAN BE INSTALLED BY ANYONE, ANYWHERE. NO TOOLS ARE REQUIRED AND RODS DO NOT HAVE TO BE CLEANED BEFORE INSTALLATION.
SATISFACTION GUARANTEED
This revolutionary new coil scraper is the result of years of experience and study in the development and manufacture of paraffin control equipment. We believe it nears perfection in eliminating paraffin problems in pumping wells. Check its many advantages and we believe you'll agree our new scrapers are the best in the field — try 'em 60 days and if you're not completely satisfied with their performance, send them back for full credit.
STAND OUT FEATURES OF THE NEW S-I-W COIL SCRAPER:
Easy to install—no tools or preparation necessary.
Will not slip on the rod.
Does not restrict the flow of oil.
Keeps rod centralized and reduces tubing wear.
Easily replaced or respaced.
Economical — long wearing. Only slight indications of wear after one year field test.
Write for illustrated folder giving complete details.
IF NOT COMPLETELY SATISFIED AFTER 60 DAYS, RETURN TO US FOR REFUND OF PURCHASE PRICE.
SUNSHINE IRON WORKS
601 W. MURPHY
ODESSA, TEXAS

WECO
FIG. 600
UNION!

*T. M. Reg.
U. S. PAT. OFF.

With the advent of the Weco Fig. 600 Union twelve years ago operators had, for the first time, a 6000 p.s.i. test union with wing nut and the new, fast Weco "Dixzy" thread, PLUS the bonus feature of a replaceable bronze seat. The basic design of this strong, tough union has met every test of toughest oil industry service . . . withstood every challenge to its leadership in fast make-up, easy break out, strength and extra long life.



The replaceable bronze seat insert in the female sub assures a surface unimpaired by rust on lines involving condensation.

Many operators have standardized on Weco Fig. 600 because the replaceable bronze seat prolongs its use far beyond the normal service life of ordinary unions . . . because it is available in sizes 1" through 4" with all parts interchangeable . . . because it is ideal for BOILER HOOK-UPS — BLOWOUT PREVENTER LINES—MUD LINES—STAND PIPE CONNECTIONS — BOILER HEADERS—HIGH PRESSURE SEPARATOR LINES.

It's Wise to Standardize with... **WECO...**

WELL EQUIPMENT MFG. CORP.
Division of Chiksan Company
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Exclusive Sales Representative Outside Mid-Continent Area
CHIKSAN COMPANY
Brea, Calif. Chicago 3, Ill. Newark 2, N. J.
Export Sales: CHIKSAN EXPORT COMPANY Brea, Calif. Newark 2, N. J.

Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

has increased so markedly over the 1939-1951 period.

"Actually, although shipments to the Eastern Hemisphere have decreased significantly percentagewise during the period indicated, the volume has increased some 34,000 bbl. a day. At the same time, shipments to the Western Hemisphere have increased 350,000 bbl. a day."

A. T. Proudfit, president, Creole Petroleum Corp., addressing annual meeting of stockholders, New York.

Senatorial Exception

"The tidelands are like a piece of wildcat oil property in disputed ownership. It's like two heirs contending for that one-eighth royalty, which is the plum at stake.

"To magnify the issue of states versus federal rights to the tidelands into charges of 'robbery' is to ignore facts.

There's been too much of that on both sides. The states affected call it usurpation of power by the federal Government. Federal spokesmen, including the President, say oil companies are trying to steal the lands.

"Actually, the return to the lease holder is the same, whether the lease buyer is an individual or an oil firm."

Sen. Mike Monroney (D-Okla.), speaking in Washington.

Twice in a Lifetime

Sir:

The two most important changes for the better The Oil and Gas Journal has made in its lifetime lie in your change in size of the paper from a mother hubbard to the smaller one you publish now, and in the swell new type face debutted in the May 12 issue. This is the easiest reading type I've ever known. Congratulations!

A. M. Lockhart, president,
Envoy Petroleum Co.,
Long Beach, Calif.

CALENDAR OF EVENTS

JUNE

5- 6 Natural Gas and Petroleum Association of Canada, Niagara Falls, Ontario.

5- 6 Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh.

5- 7 National Oil Scouts and Landmen's Association, annual convention, Hilton Hotel, Albuquerque, N. M.

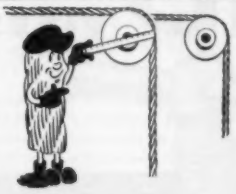
7 California Natural Gasoline Association, annual June Frolic, Rio Hondo Country Club, Downey, Calif.

DRILLERS...

do you want to cut operating costs?

Here are a few tips on longer Wire Rope Service Life!

J&L STEEL



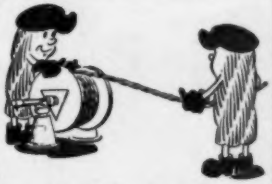
Avoid Small Drums and Sheaves

Keep Lines from Rubbing

Keep Drums and Sheaves Aligned

Check Your Sheave and Drum Grooves

Lubricate Your Lines Regularly



Use Jacks When Transferring Lines from Reel to Drum

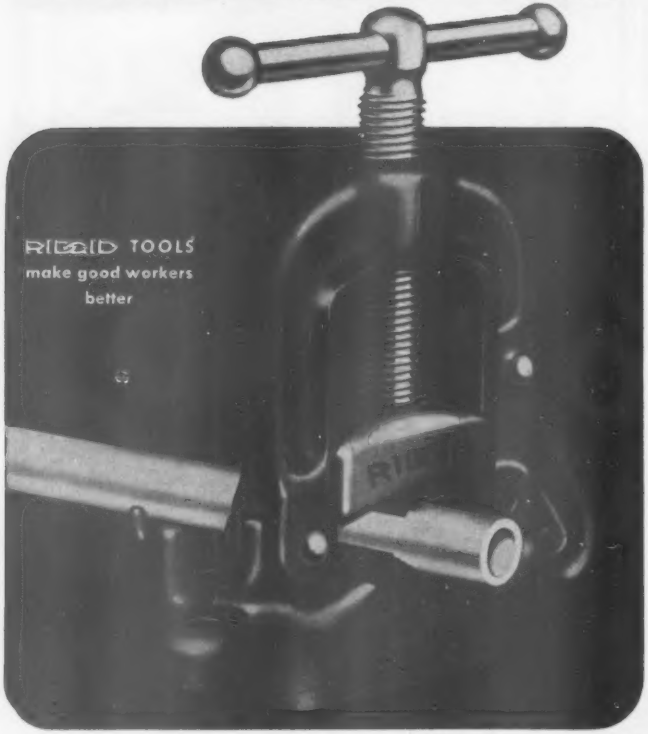
SPECIFY J&L DRILLING LINES FOR YOUR EQUIPMENT

Proof of the value of any wire line lies in its performance on the job. The unexcelled performance record of J&L Wire Ropes can be traced to J&L's *quality control* method of manufacture. *Quality control* that ensures the finest finished product by regulating every step in the manufacture of wire rope from the mining of iron ore to final stranding and closing operations. The result is wire rope that provides maximum service life—helps keep your operating costs to a minimum by cutting down time for re-rigging and making possible *maximum hole per wire rope dollar.*

If you're not already using J&L drilling lines, why not contact your nearest J&L representative *today.*

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Why skilled workmen Choose RIDGID PIPE VISES



8 sizes for pipe from ⅛" to 6"

It's extra easy to work with RIDGID Bench Yoke Vises

★ All have handy integral pipe rests and benders.

★ Yokes and bases of strong special malleable; top quality tool-steel jaws—LonGrip jaws up to 6" capacity.

★ Made in bench, post, kit, stand and tristand models. Chain vises in bench, post, stand and tristand models.

★ Buy work-saver RIDGID vises at your Supply House.

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Work-Saver Pipe Tools

8-12	Canadian Gas Association, Chateau Frontenac, Quebec.
9-14	American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver.
12-13	Western Petroleum Refiners Association, regional technical and industrial-relations meeting, Broadview Hotel, Wichita.
13-14	Rocky Mountain Oil and Gas Association, midyear meeting, Rainbow Hotel, Great Falls, Mont.
16-19	American Society of Mechanical Engineers, semiannual meeting, Sheraton-Gibson Hotel, Cincinnati, Ohio.
16-23	International Gas Conference, Brussels, Belgium.
19-20	Kentucky Oil and Gas Association, annual meeting, Hotel Lafayette and Phoenix Hotel, Lexington, Ky.
23-25	Petroleum Equipment Suppliers Association, Mark Hopkins Hotel, San Francisco.
23-24	Michigan Gas Association, annual meeting, Grand Hotel, Mackinac Island, Mich.
23-27	American Society for Testing Materials, annual meeting, Hotel Statler, New York.
23-27	American Institute of Electrical Engineers, summer general meeting, Nicollet Hotel, Minneapolis.
23-27	American Society of Mechanical Engineers, Oil and Gas Power division, annual conference and exhibit, Hotel Statler, Buffalo, N. Y.

JULY

21-25	National Conference on Clays and Clay Technology, University of California, Berkeley.

AUG.

1- 3	Wyoming Geological Association, field trip, Big Horn basin.
11-13	Society of Automotive Engineers, national West Coast meeting, Fairmont Hotel, San Francisco.
19-22	American Institute of Electrical Engineers, Pacific general meeting Westward Ho Hotel, Phoenix, Ariz.
25-27	Twelfth Annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

SEPT.

3- 5	Pacific Coast Gas Association, Ambassador Hotel, Los Angeles.
8-12	Instrument Society of America, seventh national instrument conference and exhibit, Cleveland.
10-12	National Petroleum Association, fiftieth annual meeting, Hotel Traymore, Atlantic City, N. J.
11-13	American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago.
25-26	Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo.
28-30	American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City.

OCT.

1- 3	Interstate Oil Compact Commission, fall meeting, Banff, Canada.
1-3	National Association of Corrosion Engineers, South Central Region, technical program and committee meetings, Jung Hotel, New Orleans.
1- 3	American Institute of Mining and Metallurgical Engineers, Mid-Continent fall meeting, petroleum branch, Rich Hotel, Houston.
2- 3	Petroleum Electric Power Association, twenty-third annual meeting, Mayo Hotel, Tulsa.

6	Independent Natural Gas Association of America, annual meeting. Fontenelle Hotel, Omaha, Neb.
9-10	California Natural Gasoline Association, twenty-seventh annual fall meeting, Ambassador Hotel, Los Angeles.
13-15	Texas Mid-Continent Oil and Gas Association, thirty-third annual meeting, Hotel Texas, Fort Worth.
13-17	American Institute of Electrical Engineers, fall meeting, New Orleans.
16-19	Permian Basin Oil Show, Odessa, Tex.
19	Natural Gasoline Association of America, southern regional meeting, Blackstone Hotel, Tyler, Tex.
20-21	Independent Petroleum Association of America, annual meeting, Mayo Hotel, Tulsa.
22-24	Society of Automotive Engineers, national transportation meeting. Hotel William Penn, Pittsburgh, Pa.
23-24	American Institute of Mining and Metallurgical Engineers, West Coast fall meeting, petroleum branch, Statler Hotel, Los Angeles.
27-31	American Gas Association, annual convention Atlantic City, N. J.
30-Nov. 1	Rocky Mountain Oil and Gas Association, annual meeting, Cosmopolitan Hotel, Denver.

NOV.

3- 4	Society of Automotive Engineers, national diesel engine meeting, Chase Hotel, (tentative), St. Louis, Mo.
6- 7	Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa.
6- 8	Gulf Coast Association of Geological Societies, annual fall meeting, Hotel Driscoll, Corpus Christi, Texas.
8-13	Oil Industry Information Committee, Conrad Hilton Hotel, Chicago.
10-13	American Petroleum Institute, thirty-second annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
13-14	Society of Exploration Geophysicists, midwestern meeting, Texas Hotel, Fort Worth.
20-22	Instrument Maintenance Short Course, jointly sponsored by Southern California Meter Association and Los Angeles Harbor Junior College.
30-Dec. 5	American Society of Mechanical Engineers, Statler Hotel, New York City.

DEC.

5- 6	Interstate Oil Compact Commission, winter meeting, Wichita, Kans.
7	Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex.
7-10	American Institute of Chemical Engineers, annual meeting, Hotel Cleveland (Hqs.) and Carter Hotel, Cleveland.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

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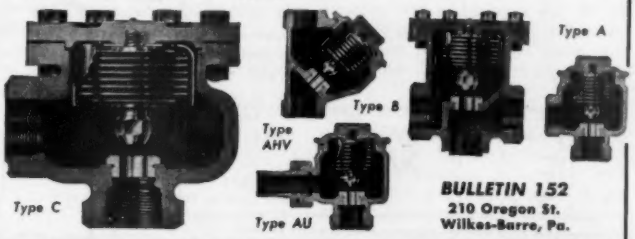

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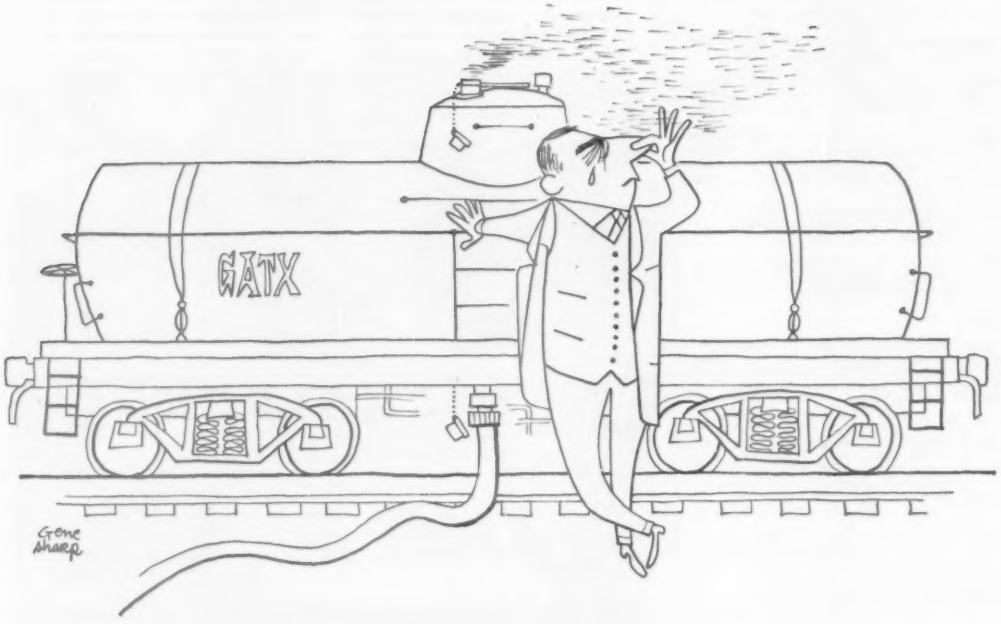

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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

Table of Contents

A BIG change has been made in this issue of the Big Yellow Book—the Table of Contents page is just inside the front cover instead of next to the Editorial where it's been for many years.

This change has been requested by our readers for a long time. We've been wanting to make the change for a long time. But the shift wasn't as easy to make as the average reader would suppose.

To move the contents page we had to plan a whole year ahead, and we had to install some new and expensive machinery to handle it.

To tell why this was so requires an explanation of the mechanics of printing, the economics of the publishing business, and the speed with which a weekly magazine must be produced.

We'll try to explain it as simply as possible. A newspaper or a "saddle-stitched" magazine can be printed all at one time on a big rotary press. Magazines like the Journal are built up of a number of individual "forms" of 16 or 32 pages each and these are then assembled in proper order and "side-stitched" with a couple of big staples before the cover is glued on. Each form has to be printed separately, and it takes about 25 hours to run a single form through a press.

So we had this dilemma: Either have enough presses to hold all forms until the latest possible moment and print them all at once and then let the presses stand idle the rest of the week; or keep the presses (and the pressmen) busy all week by printing some forms earlier than others. Simple economics dictates the second choice, so different forms go to press at different times all through the week.

Obviously the table of contents must be the last page written if it is going to list the late news items—which often are switched around at the very last moment. So, up to now, we have included it in the news form, which is the last one to go to press.

It may be difficult for you to understand, but for months we figured and figured but couldn't find any way to hold open a page in the front form (which, being all ads and containing a lot of color, normally starts to print a week or more ahead of mailing day). The only way to do it would have been to buy a new big press and hire a whole crew, just for about 25 hours of work each week.

Of course if we were a monthly, or if we printed several magazines in the same shop, the problem would have been simpler. A monthly normally takes much more time in the manufacturing process. But since we carry so much important news every week it is of primary importance to get the magazine to the readers at the earliest possible moment after the news is set in type.

So here's what we did: We installed a very fast, little one-man press that handles just two pages at a time, and we use that to print the table of contents on a separate sheet. In this way the table of contents can be written after the news form is "locked up," and both can be printed simultaneously. Then we installed a pasting machine—a very intricate mechanical monster—to stick this single sheet onto the front of the first form so that the two can be handled by the assembling and binding machine as a unit.

But before we could do all that we had to make arrangements with several advertisers who have traditionally used "special positions" opposite the table of contents, inside the front cover, and elsewhere. We had to convince them that the readers wanted the table of contents just inside the front cover, and that what was best for the readers would be best for the advertisers, too.

It's all been accomplished now, and the shift has been made. We certainly hope you like it, because that's what most of you have been asking for. Just thought we'd explain some of our problems so you wouldn't think it was pure cussedness that kept us from making the change long ago.

Henry D. Ralph

duplex

DUPLEX

.....a good name to remember

Baker DUPLEX Cement Wash-Down Whirler Float Shoe — Product No. 360

WHAT YOU CAN DO WITH BAKER DUPLEX EQUIPMENT

successfully cement liners, combination strings, and perform certain types of two-stage cementing.

cement blank sections of pipe below a perforated section, without any need to use auxiliary equipment.

wash out cavings ahead of the string when setting a liner. Without DUPLEX Equipment you can circulate only through the topmost perforations—with DUPLEX you can circulate clear to bottom.

you can control the amounts of materials used, and (without change) run caustic or oil, then run plastic, in sequences and quantities as desired.

you eliminate the need for auxiliary equipment (such as retainers or retrievable cementers) when you use Baker DUPLEX.

you can use DUPLEX equipment either with or without a liner hanger.

you have complete control of the liner at all times when DUPLEX Equipment is used. The liner can be raised or lowered, and is positively held down in place while cementing.

a bridging ball can be dropped (after cementing) and circulation carried on above the DUPLEX Equipment without disturbing the green cement.

Baker Combination Product No. 383 with a DUPLEX Whirler Float Collar. Cement is held above the Metal Petal Basket.

How DUPLEX Equipment is made

DUPLEX Float Shoes and Collars are similar to other Baker Float Shoes and Collars in most features, but have a female left-hand thread assembly (of drillable cast iron) accurately anchored just above the Back-Pressure Valve. By means of a mating male Left-Hand Square Thread Sub, the cementing string is easily connected to (or disconnected from) the DUPLEX Shoe or Collar.

How DUPLEX Equipment Operates

In simple liner work, a DUPLEX Wash-Down Whirler Float Shoe is connected to the bottom joint and the balance of the liner is run into the well, with the last joint held in slips or clamps. A cementing string of sufficient length then is run to connect the male Left-Hand Square Thread Sub to the female left-hand assembly in the shoe, to form a quick, fluid-tight connection.

The portion of the cementing string above the liner is then run, with the DUPLEX connection carrying the weight of the liner. After cementing, the back-pressure valve prevents any flow-back of cement slurry placed outside the liner. The cementing string is then disconnected by rotating to the *right;* excess cement washed out; and the cementing string removed from the well.

Various combinations of Baker DUPLEX Equipment are used to perform more complex operations, such as cementing behind liners at different levels; cementing above and below cavities; between producing zones; and similar work.

The Baker representative or office nearest you is available to discuss proper use of Baker DUPLEX Equipment in your well completions.

BAKER OIL TOOLS, INC.

HOUSTON • LOS ANGELES • NEW YORK

BAKER

GUIDING, FLOATING AND CEMENTING EQUIPMENT

DUPLEX

The oil strike is over but its effects linger on

OPERATIONS in most of the oil industry are going to be abnormal for weeks and perhaps months as the result of the strike which closed a third of the nation's refining capacity for more than 3 weeks.

Crude production will be low, refinery runs will be high, and distribution will follow unusual patterns until stocks return to near normal.

The industry's machinery for collecting statistics on its operations has not yet caught up with the interruptions caused by the strike, so the current picture is not clear in all details. But the general outlines can be seen.

STOCKS of crude petroleum, at around 280,000,000 bbl., are the highest in more than a decade, because crude production was not curtailed as much as refinery runs. Such a high inventory is generally considered uneconomic and unwieldy, and also is probably close to the practical limit of physical storage capacity.

So, inevitably, crude output must continue below prestrike levels until refineries work down a considerable portion of these stocks. This may take all summer.

Meanwhile, refineries must run at close to maximum capacity for many months to rebuild inventories of refined products. We are now entering the period of high gasoline consumption when it will be difficult to build stocks of this product, but there should be no difficulty in meeting all demands if there are no further interruptions in refinery activity.

Aviation gasoline presents a different and more difficult situation. Capacity to produce this specialized product has been barely equal to demands since the Abadan refinery in Iran was closed about a year ago. New capacity is under construction but much of it will not be in operation for some time. So fuel for both military and civilian flying may be uncomfortably tight all summer.

Heating oils present the most confusing picture. A normal winter uses up just about all the stocks accumulated during the preceding spring, summer, and fall. There have been several winters during the past decade when a loss of refinery production such as we have just experienced would have caused extreme shortages of heating oils. As of today it appears that only the weather man can tell whether or not consumers will suffer next January as a result of the oil strike this May.

ALL this dramatizes the narrow margin on which the oil industry operates, and the close interdependence of its various segments. It is virtually a hand-to-mouth industry, with very little slack to cushion an emergency. That is why the industry is under such pressure to expand its facilities to provide more reserve capacity in all its operations.

7½ TON FORGINGS

NICKEL ALLOYED STEEL FORGINGS for the new $55,000,000 Mid-Valley pipe line ... a joint undertaking of Sun Oil Company and Standard Oil of Ohio ... built to carry 150,000 gallons of oil daily through pipe of 20" and 22" diameter. These rings are 83" OD x 76" ID, with a face width of 21".

How Nickel Alloyed Steel Strengthens Gears that Power a Pipe Line

These giant ring gear blanks weigh 7½ tons each...

This pair is from a batch being forged, heat-treated and rough-machined at The National Supply Company's plant in Torrance, California.

After teeth are cut and finished, all will serve in pumping stations along the new 100-mile Mid-Valley pipe line.

These nickel alloyed steel forgings will form the outer rims of bull gears in eight 1700-horsepower speed-increaser units... the largest ever built for pipe lines in this country.

National Supply engineers specify Type 4340 nickel-chromium-molybdenum steel for these ring gears, to assure ample strength, toughness and wear resistance. Excellent depth hardening properties make Type 4340 particularly desirable for heavy duty forgings. Moreover, outstanding fatigue strength characterizes this nickel alloyed steel.

At the present time, most of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of engineering nickel steels for many end uses in defense and defense supporting industries.

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

THIS WEEK

FULL CRUDE-OIL STORAGE was the story over the nation last week as a lingering result of the nationwide refinery strike. The outlook was for reduced production during coming weeks while refineries stepped up their throughput to bring inventories of crude down to normal levels. Oklahoma last week trimmed its allowable 10 per cent, following Texas' lead in restricting production in June.

PIPE LINES.—Contract let for first section of Buckeye products line in the East. . . . First section awarded H. L. Gentry to be 16-in. from Linden, N. J., to near Allentown, Pa. . . . ¶Completion of pump stations to increase capacity of Plantation system to 221,000 bbl. daily. . . . ¶FPC asked to approve gas-gathering system along Wilcox trend in South Texas with capacity of 100,000,000 cu. ft. daily. . . . Project would include 157 miles of 14 and 16-in. main line.

REFINING.—Esso Standard announces it is considering plans to build a new refinery on eastern seaboard, probably in Virginia or North Carolina. . . . ¶California product stocks down to 70 days' supply as refiners are pressed to meet record demand. . . . ¶United States lube-oil capacity set at 171,175 bbl. daily at beginning of 1952 in PAD study. . . . Expansion added 22,000 bbl. of capacity in 1951. . . . ¶Decision on increasing ceilings of product prices on East Coast expected by June 10. . . .

INTERNATIONAL.—Iran claims 5-year contract for sale of crude oil signed with unidentified United States company. . . . Sale would involve 3,000,000 tons yearly. . . . State Department says it has heard nothing. . . . ¶Shell to shut down 30,000-bbl. refinery in Aruba at year's end. . . . Storage facilities to be retained. . . . ¶Unused crude line linking Kirkuk field with Haifa refinery reported badly deteriorated. . . . Line out of service since political shutdown in 1948. . . . ¶Jersey Standard marketing affiliate in Colombia expected to seek Colombian financial participation in company again. . . .

INDUSTRY.—Ralph Lowe, Midland independent, sells three-eighths interest in option on 23,000-acre spread in Texas' Andrews and Ector counties for $6,000,000 plus other considerations. . . . ¶American Liberty buys interest in 32 wells in Paul Pewitt field. . . . ¶Birch Oil Co. holdings in California's old Brea field sold for $1,505,000. . . . ¶Developments in Honor Rancho-Castaic Hills area indicate field is one of California's most important finds in recent years. . . . Production peak upon completion of development program estimated at in excess of 10,000 bbl. daily. . . .

ACTIVITY.—Complete data on crude production for week ended May 24 are not available. . . . ¶Total well completions for the week decreased 12 wells to 896. . . . Wildcat completions totaled 210 compared with 181 for previous week and 201 for same week last year. . . . ¶Rotary rigs operating in United States on May 26 decreased 27 rigs to 2,811 compared with 2,443 last year. . . .

TRENDS.—Crude stocks totaled 281,781,000 bbl. on May 17 and are expected to increase to 285,000,000 bbl. by the first of June. . . . The median of the desirable range for crude inventories is about 250,000,000 bbl. . . . Even if crude production is cut enough to reduce stocks 300,000 bbl. daily, it will be September before crude stocks are back to normal. . . .

GOVERNMENT.—Price Stabilizer Arnall tells House committee no increase in crude-oil prices is necessary. . . . Government official says under price controls industry last year added a record amount of reserves, drilled a record number of wells, received record profits. . . . Price chief says ceilings will not be raised unless required by Defense Production Act changes. . . . ¶Interior Secretary Chapman lifts all controls on products resulting from recent strike. . . . Even restrictions on use of aviation gasoline removed as more refineries return to production. . . .

DEMAND.—Petroleum products demand shows signs of tapering off. . . . Increases during the next 2 years will be less than for the past 2 years but still greater than the long-term average, as pegged by E. T. Knight, Atlantic Refining Co. economist, in address before A.P.I. lube committee. . . .

INTEREST IN CAT REFORMING is restricted in California to its aromatics application. A 17,000-bbl. T.C.R. unit was announced recently by General Petroleum Corp. for its Torrance refinery shown here, and Standard Oil Co. of California has a 10,000-bbl. Platformer for production of benzene, toluene, and xylenes under way at its El Segundo plant.

Refiners' Future

Long-term outlook is for steadily increasing shortage of local crude; research is pushed to obtain maximum yields

George Weber

SAN FRANCISCO.—California refiners currently are hard pressed to meet a record demand for all types of petroleum products.

In contrast to operators in other sections of the country, who, prior to the strike, were reducing crude runs to stills, Pacific Coast refiners have been unable to meet all requirements.

The situation here is abnormal. Refining facilities formerly have been kept in balance with normal demand from West Coast markets and off-shore markets normally served from California. Two factors are responsible for the present unbalanced situation; the Korean war and the closing of the Abadan refinery in Iran.

Robert L. Minckler, president of General Petroleum Corp., summed up the situation in an address he made here recently before the National Federation of Financial Analysts Societies.

The currently acute supply situation, he said, arises from an outside demand due to the two named causes. It amounts to an estimated 140,000 bbl. per day, which is superimposed on a normal demand of about 915,000 bbl. per day.

This added load has been met by withdrawing from stocks at the rate of about 35,000 bbl. per day, supplying 20,000 bbl. per day through processing of unusual and expensive imported crudes, and increasing refinery runs by about 85,000 bbl. per day.

As a result, California stocks of all products are down to a low of about 70 days' supply, and even though the extraordinary outside demand is expected to lessen to some extent, refiners will need to maintain capacity operations for some time before they will have built stocks back to normal levels.

Long-term situation . . . The present short-term situation to some extent obscures the long-term position of the West Coast industry.

Current extra requirements aside, California will shortly pass from a position of petroleum oversupply to one of balance with normal demand. This will be followed gradually by an increasing shortage of local crude oil—barring the rather unexpected discoveries of major new oil reserves in the state.

Minckler estimates present California oil production to be 75,000 to 85,000 bbl. per day in excess of normal demand in natural markets. In general, a period of balance between local supply and demand will exist for a period of 2 to 3 years, he believes, and by 1955 an over-all shortage of local crude will exist.

Two years hence he sees domestic civilian demand amounting to 915,000 bbl. per day, military demand of 100,000 bbl. per day, and offshore demand of 25,000 bbl. per day. This total, less about 135,000 bbl. per day to be supplied from outside California, leaves an expected California crude requirement of 905,000 bbl. per day, as compared with current withdrawals at the rate of 975,000 to 980,000 bbl. per day.

Reese H. Taylor, president of Union Oil Co. of California, has estimated a total West Coast petroleum demand of 1,200,000 bbl. per day by 1955, and 1,300,000 bbl. per day by 1960. This appears conservative when compared with the 61 per cent jump in demand from 1941 to 1951, which was augmented by World War II, the defense effort in the Pacific, the Korean war, a record population influx to the West Coast, and a sharp increase in automobiles and in industrial activity.

Yield adjustments . . . The prospect on the Pacific Coast is for a steadily rising demand for light and middle distillates and a probable net decline in residual consumption. Population increase and greater industrialization will bring about higher gasoline, burning-oil, and fuel-oil requirements.

On the other hand, additional natural gas coming from outside California will, in all probability, cut into the burning-oil market to some extent and will take care of most, if not all, of the increased heavy-fuel demand from power and industry.

Importation of natural gas from Texas and New Mexico began in 1947 and this year nearly half of the gas supplied to 3,000,000 California customers comes from those out-of-state sources,

according to J. B. Black, president of Pacific Gas & Electric Co., San Francisco. Still greater volumes are scheduled from the Permian and San Juan basins.

Increased exploration in Utah and other Rocky Mountain states may be expected to develop new gas sources for California consumption.

Canadian gas is considered a strong future possibility for the Pacific Northwest.

This continuing influx of fuel from outside California will invade some coastal burning-oil markets and will in time replace some heavy fuel consumed by industry.

A moderate loss of heavy-fuel outlets is foreseen in the ship-bunkering business. The dieselization of railroads is rapidly swinging that business from fuel oil to diesel fuel—at a net loss in volume.

Not all refiners are pessimistic about the future demand for fuel oil, however. Some point to a projected increase in steam-electric generating capacity in the region to provide for the greater-than-average population growth. There exists a large potential market for heavy fuel as standby for hydroelectric power in dry years.

Also, fuel oil has no potential competition from coal since there is no local low-cost coal supply. More than 90 per cent of the energy supply for the Pacific region comes from oil and natural gas, in contrast to a nationwide average of 56 per cent.

Excess is marginal . . . Statistically, California has an excess of refining capacity. But the excess, amounting to roughly 100,000 bbl. per day can be counted as marginal facilities in both small and large plants.

Half of the state's 43 operating refineries, with a total of only 7 per cent of aggregate crude capacity, consists of small skimming plants without any thermal cracking facilities. These and a number of other units in small and large refineries are outmoded and will require replacement or modernization to compete in future operations.

The eight principal companies, mostly majors, who operate in the state, represent 87 per cent of crude capacity distributed in 15 refineries. They operate 96 per cent of thermal cracking capacity and all of the catalytic cracking facilities.

Due to a lower availability of distillate fractions for cat feed stocks, the state ranks well below the national average in the ratio of cat cracking capacity to crude capacity. The ratio of thermal cracking capacity equals the national average.

Production handicap . . . The record demand for products has brought back into production all of the lower-gravity crude production previously shut in. As a result California refiners are further penalized on gasoline and middle distillate yields.

This spring, the gasoline yield averages about 37.5 per cent on crude, distillates 17.5 per cent, and residuals 36.5 per cent, as compared with yields in the rest of the country of 46.5 per cent for gasoline, 27.0 per cent for distillates, and 16.5 per cent for residuals. Operation at or over rated capacity, coupled with the good market for fuel oil combine to give a current over-all residual yield which is somewhat higher than normal although deep vacuum-distillation and coking are still important in maintaining a high gasoline yield.

The universal aim is to improve gasoline production, since the Pacific Coast maintains a high per capita ownership of automobiles. In Los Angeles County alone, where 60 per cent of the state's automobiles are concentrated, about 2,100,000 cars average about 50 miles daily driving.

Expansion scheduled . . . To meet anticipated demands for more gasoline and intermediates, refiners have about 100,000 bbl. per day in new crude capacity either under construction or planned. A moderate amount of net catalytic cracking and reforming capacity is scheduled, and much interest is noted in extending and improving vacuum flashing of crude bottoms.

There is a substantial potential interest in coking, but with the present fuel-oil market, coking is favored more as a thermal cracking operation for light products than as a means for reducing residuals. Several refiners plan to adopt or expand coking operations in the future but will not do so until the market for heavy fuel has depressed considerably from its present level.

The good fuel-oil market has attracted some refiners away from asphalt manufacture, and a critical shortage of cutter stocks exists at present.

No octane race . . . California crudes make a sufficiently high-octane gasoline to meet current civilian requirements, and refiners at the same time contribute largely to the high-octane military demands for the Korean war. As a result it appears highly improbable that any octane race will develop on the West Coast this year.

Refiners are unanimous in condemning such a move as unnecessary, and wasteful. While it takes but one large refiner to start such a trend, none has expressed any such intention.

Even if refiners were so inclined, they point out that excessive requirements for all the high-octane blending stocks they can make would render any appreciable octane increase uneconomic.

Research pushed . . . Should the long-term position on the West Coast follow the predicted transition from one of balance in local crude supply to one of shortage, California refiners may well be watched for indications of what is in store for the remainder of the nation.

Out-of-state crudes will reach the coast in amounts necessary to meet demand for many years to come. But crude costs at refineries will undoubtedly continue to rise above the national average, and refiners will be alert to every modern process which economically can give them maximum yields of the higher-valued light and intermediate distillates.

Anticipating this, a sizable research effort is going forward. A thorough study of deep vacuum flashing is under way. While nothing spectacular is expected to result from this work, intensive pilot-plant operations may be expected to play an important part in the future trend toward taking still-deeper overhead cuts in reduced crudes to boost cat feed-stock volumes.

Coking is the object of further West Coast research. Lummus Co.'s new continuous-contact coking operation was perfected in a semicommercial unit at Richfield Oil Corp.'s Watson refinery. Union Oil Co. of California, as well as Richfield, made important contributions to its successful development.

Other research laboratories on the coast are conducting pilot-plant studies of coking which may lead to further improvements in the conventional delayed-coking operation.

The long-range outlook for higher requirements for diesel and jet fuels is prompting research into the possibilities of increasing both the yield and quality of intermediates.

A particular problem, which Union Oil faced in processing sour low-gravity Santa Maria crude, has led to the development of a mild hydrogenation process which will upgrade Santa Maria coker distillate to high-quality diesel and jet fuel.

Union's cobalt molybdate catalyst, employed at lower pressure and higher temperature has proved successful for catalytic reforming in pilot-plant tests. The latter adaptation, which they have termed Hyperforming, will use a moving catalyst bed affording continuous catalyst regeneration.

The process incorporates still another Union development involving a new principle in the mass flow of solids. Catalyst will be lifted by Union's new Hyperflow technique, which shows

great promise of application in other refining processes.

While hydrogenation as a means of upgrading cracked intermediates has been looked at by many research staffs, most have found that the high pressures and hydrogen requirements are economically prohibitive. Union's work, prompted by necessity, may serve as a guide to wider adoption of mild hydrogenation in the future.

California refiners are aware of further process improvements which may improve over-all product values. Present light-distillate treating methods, they say, leave much to be desired. Improved treating, involving such techniques as electrolytic caustic regeneration and catalytic desulfurization, will receive ready attention in this area.

Specialty asphalts also are attracting interest, and some operators feel that they could substantially upgrade this residual fraction by devoting more attention to production of specification grades for other than paving and roofing markets.

New crude supplies . . . The first outside crude to be brought into the Pacific region in any appreciable volume will be from Alberta. It will be moved 693 miles into the Vancouver area through the 24-in. Trans Mountain oil pipe line. Initially, the line will have a capacity of 75,000 bbl. per day.

The immediate effect will be a displacement of California crudes in three small British Columbia refineries. Their present combined capacity of 27,350 bbl. per day will undoubtedly be expanded to supply the 40,000-bbl. per day local market.

As it becomes competitive with California crude, some Alberta crude will be moved into California refineries, and refineries based on that crude eventually will be built in the Pacific Northwest. There will, however, be no rush on the part of several California refiners to build new refineries in Washington and Oregon. A number of hard economic facts must first be carefully considered.

The established transport system serving the area with products from California plants, will make it economic to move Canadian crude from Vancouver to San Francisco or Los Angeles refineries. Products can be returned to the growing northern markets in the same tankers. This factor, coupled with the high cost of constructing complete new refineries in the north may delay that program beyond popular expectations. To prove economic, a new refinery in the Pacific Northwest will have to have a minimum capacity on the order of 40,000 to 50,000 bbl. per day.

While several California refiners are now studying the prospects for such plants, it is probable that only one large one will be built originally, to be followed perhaps some time later by more.

Those companies without refineries in the San Francisco Bay area may be most likely to enter the field first. General Petroleum has announced tentative plans for such a plant, and Richfield is known to be considering the same proposition.

In design, these new plants will differ mainly in providing a maximum middle-distillate yield to meet the relatively higher demand for stove oil and other intermediate fuels.

Other possibilities . . . Two other possibilities are to be considered in the Pacific Northwest. The first is a gradual displacement of California products in inland markets by growing refinery operations in the Salt Lake City area. Currently well supplied with Rangely and other Rocky Mountain crudes, four local refineries are running at capacity. A fifth is under consideration, and some existing plants are slated for expansion.

From this newly expanded refining center, products are moving in increased volume up the Salt Lake Pipe Line Co. line to Idaho and eastern Oregon and Washington.

In addition, Sinclair Refining Co.'s plant in southwestern Wyoming will be tied into Salt Lake City this year by a new products line, and a second line tying in Casper has been announced.

Should the development of Uinta basin production meet expectations, movement of Utah products to the northwest will probably increase further.

A new Pacific Northwest refinery on tidewater may also have to share the area market with expanded refining facilities east of the Cascades. There is talk that some Trans Mountain crude may be made available to eastern Washington through a takeoff line to Spokane.

West Texas crude . . . Major refiners in California generally discount the feasibility of bringing in Permian basin crudes. The present price differential between Texas and California crudes of comparable gravity will not warrant such a line in their estimation. Operators say they are not equipped to handle the higher sulfur content which would result from addition of Permian basin crudes to their runs.

Although the line is expected to have government sanction, West Coast refiners believe that financing the $75,000,000 project is going to prove difficult, since private capital will not be forthcoming without firm purchase commitments from the California end.

The tendency among many refiners is to look to Alberta as the first economic outside crude source. They point out that while West Texas crude has established outlets to the Gulf Coast and Midwest, Canadian crude, in the future, may well depend more and more on western outlets when Canadian refineries to the east are supplied. They see the Williston basin as offering possible strong competition to Canadian crudes seeking outlets in this country's Middle West.

Crude imports from the Far East now are coming into California in small volume, and this summer will see some Arabian crude crossing the Pacific as a temporary expedient for filling the current record demand.

As a secondary source of outside oil, after Canada, California refiners are looking to the Intermountain area. Increased exploration activity centering in Utah offers the possibility of providing further supplies for coastal plants as California production follows its expected future decline.

Growing Field

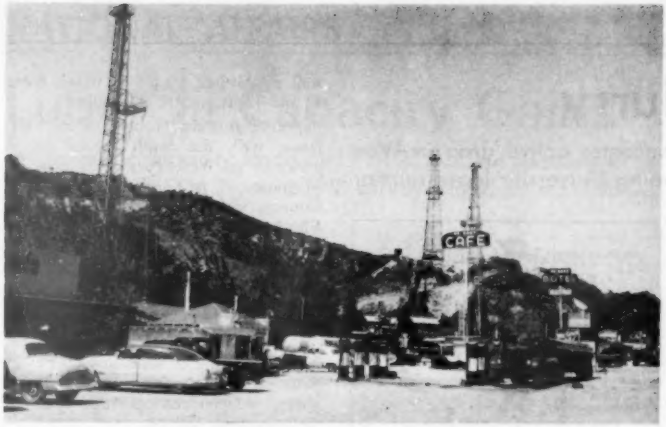
Peak output of Honor Rancho-Castaic Hills field expected to exceed 10,000 bbl. daily; area now has 23 producers

D. H. Stormont

LOS ANGELES.—Developments of recent weeks have tended to emphasize that the Honor Rancho-Castaic Hills field in upper Santa Clara Valley, 35 miles northwest of here, is one of California's most important field discoveries of the past 3 years.

Development of the recent Wheeler Ridge Eocene discovery might prove it to be of greater importance, but for the time being the extent of this Kern County find is an unknown quantity.

Twenty-three producers have been completed along the 2½-mile Honor Rancho-Castaic fault-line trend, and 60 or more probably will be added. From a current daily production of approximately 4,500 bbl., the field's output probably will reach a peak in excess of the 10,000 bbl. mark. If the area were



TOURISTS GET A GOOD VIEW of the Castaic Hills development as they travel California's Highway 99.

drilled up at a fast pace this peak undoubtedly would be higher, but such is not expected to be the case in most of the field.

In the Castaic Hills portion, where leases are relatively small and ownership is diversified, 12 producers have been completed since the 6,000-ft. Sterling pool was discovered last summer. Because of competitive conditions development is expected to remain near the current 10-rig pace until some 30 new wells have been added west of Highway 99 (see map).

Portions of this pool along the highway are to be drilled to approximately 2½-acre well spacing; one operator plans four wells on an 11-acre tract. The Texas Co., which holds the acreage across the highway, probably will offset this development almost well for well.

Aside from this forced offset drilling, Texaco is moving at a more leisurely pace on its 2,500-acre Honor Rancho leases. Sterling sand production, which averages about 100 ft. thick in the Castaic Hills area, has been proved as far southeast as 10 Honor Rancho (Well A). Presence of a synclinal cross-fault is suspected between Well A and wells farther to the southeast which produce from the stratigraphically shallower Rancho and Wayside sands.

Wayside has an average thickness of approximately 250 ft. in seven producers and thickens to 400 ft. in some wells. It is the main Honor Rancho pay. Production from the shallower Rancho zone is spotty, but in the three wells where it is being produced the sand is about 100 ft. thick.

Discovered in August 1950, the Wayside is being developed on a 20-acre spacing. Well density is increased to 10 acres where both pays exist. Continued on this basis, plus development of the Sterling sand in the northeast portion of Honor Rancho, it appears that The Texas Co. has some 30 proved or semiproved locations yet to drill.

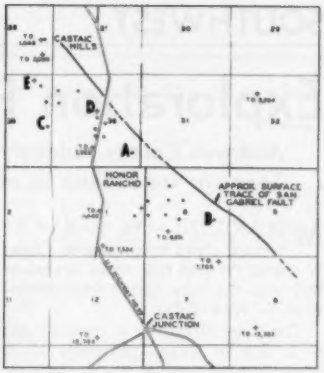
Honor Rancho limits . . . Productive limits on the northeast edge of Honor Rancho, as well as at Castaic Hills, are yet to be defined.

The San Gabriel thrust fault which truncates both westerly plunging anticlines limits production in this direction. Just how far production will extend beyond the surface trace is yet to be determined by the drill.

However, since lateral faulting during the Pliocene period caused formations from some 20 miles distant to be moved opposite these upper Miocene oil sands, there is thought to be little chance for oil production beyond the fault zone.

Texaco halted drilling at 8,000 ft. at 2 Honor Rancho-2 (Well B), after shallower tests indicated the extensioner might make a well in the Rancho sand. The Wayside was not definitely identified, but the formation believed to be this sand was too tight to produce. Because of this rapid change in formation depths and characteristics, a cross-fault is thought to exist between "B" and the pool proper.

The well was drilled deeper in search of an additional pay, such as the Sterling sand, which is thought to underlie Honor Rancho. The 8,951-ft. dry hole southeast of "B" found the Sterling sand present, but since the well was off-structure the sand was wet, as were the Wayside and Rancho zones. None of the wells on-structure were carried sufficiently deep to test Sterling potentialities.



Castaic limits . . . Productive limits of the Castaic Hills area were extended southwest by Standard Oil Co. of California 85-1 Golden (Well C). The extensioner found the Sterling sand tight and was completed for 75 bbl. daily at 6,698 ft., total depth. This may prove to be an edge well.

The Castaic Hills structure appears to be more highly faulted and complex than that of Honor Rancho. Geologists have been unable to readily account for George Terry 1 Eskridge (Well D) being dry. Some suspect a fault parallel to the San Gabriel fault and believe that the Sterling sand may prove productive farther north.

Northerly productive limits are indefinite but some control can be gained from Continental Oil Co. 2 Rynne-Fisher (Well E), which found a facies change from sand to shale.

The two dry holes farther north are the highest structurally yet drilled in Castaic Hills. Both were bottomed in upper Miocene shales, possibly of upper Mohnian age, but only the northernmost is believed to have been carried sufficiently deep to test the stratigraphic equivalent of the Sterling sand.

Brea Holdings Sold

LOS ANGELES.—Holdings of Birch Oil Co. in the old Brea field near here have been auctioned for $1,505,000 to L. L. Hillman of Hillcrest Exploration Co. The properties consisted of 17 producing wells on a 20-acre tract plus 770 acres near the field. Current production of the lease is about 250 bbl. daily.

Because the properties have been in litigation, confirmation of the sale will be ruled on by Superior Court Judge Robert Gardner on June 6. Bidding might be reopened at that time if an offer of 10 per cent more is made.

Exploration Flurry

Andrews County suddenly becomes active area in West Texas as crews flock in pending University lease auction

MIDLAND, Tex.—An influx of 13 seismic crews into Andrews County during the past few weeks has made that area the most active, exploration-wise, in West Texas.

The surge in activity is reported due to a sale of Texas University lands coming up this week in Austin (June 6).

The 13 seismic crews, according to a paper presented at the recent meeting of the Permian Basin Geophysical Society by H. L. Swords, exploration geophysicist for Union Oil Co. of California's West Texas division, are operating in and around Block 1, University Lands, southeast of the town of Andrews in the southeastern part of the county. Three chunks of acreage in this block will be up for bidding this week.

Crews distributed . . . Activity currently is about evenly distributed between the Eastern platform, Midland basin, and Central basin platform of the Permian basin.

Several seismic crews are active in the Texas portion of the Delaware basin, where most of the gravimeter crews in West Texas are concentrated.

The Edwards Plateau area, due to several good discoveries last year, available University acreage, and apparently successful air-shooting techniques, is expected to attract a number of crews now that lambing season is almost over.

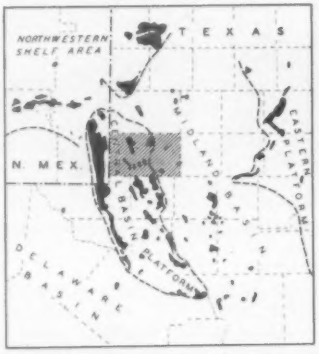
Andrews County drilling . . . Phillips Petroleum Co. has just completed 1-EE University Lands in the Block 12 area of Andrews County.

Two offset completions to the previously lone producer in the Block 11 field of the county has assured that area of further development.

The Texas Co. has staked location for 1-AB State in 22-11 University Lands Survey as a 12,600-ft. Devonian wildcat, about 6½ miles north of the Magnolia deep discovery.

Kerr-McGee Oil Industries 11-C-23 University, 23-11 University Lands, has been completed for oil in pay at 6,430 ft.

Leasing procedure . . . The Andrews County tracts will be offered for leasing this week at the first of two annual auctions held in June and December by the university.



EXPLORATORY ACTIVITY last week was concentrated in Andrews County, shaded area on the map, in preparation for bidding on Texas University lands.

Customarily, the land offered for lease is put up at the request of one or more companies—usually after seismic work has indicated favorable reservoir structures.

About 2 months prior to sale, University Lands makes public a listing of all lands up for lease, suggesting that these lands be investigated by interested persons.

As a result, companies not active in the area send in their crews to detail available acreage blocks. This amount of exploratory effort results in rather spirited bidding at the sale, and drilling blocks involving bonuses of more than $1,000,000 are no longer uncommon.

New Permian Deep Producer

MIDLAND, Tex.—Magnolia Petroleum Co. has broken the record for deep production in the Permian basin with its 1-36994 University, Section 17, Block 8, University Lands, Andrews County, Texas.

The discovery well was completed through perforations from 13,840-84 ft. in the Ellenburger for 555 bbl. of 44.7°-gravity oil daily through ½-in. tubing choke.

The former deep producer in the basin was Buffalo Oil Co.'s discovery completed in April in Maljamar pool of Lea County, New Mexico. This well established production from 13,543-73 ft. in the Devonian.

Before Buffalo brought in its Maljamar well, the depth record for a producer in West Texas was held by Magnolia at its 7 Wilson in Upton County, which was completed in the Ellenburger at 13,400 ft. last year.

Paul Pewitt Wells Sold

DALLAS. — American Liberty Oil Co has purchased two-thirds' interest in 32 producing oil wells in Paul Pewitt field of Titus County. Joe A. Humphrey, independent operator, acquired the remaining interest.

Purchase was made from Randy Moore and W. C. Stevens, both of Omaha, Neb., and Morris Coats, Longview. Cash consideration was reported to be $2,500,000.

The producing properties are on six leases which have a total production of around 1,600 bbl. daily.

American Liberty has a refinery at Mt. Pleasant, 15 miles from the Paul Pewitt field. For the present, production will continue to be sold to Humble Pipe Line Co.

Lowe Sells Lease Option

MIDLAND. — Ralph Lowe, independent who held a half interest in an option to acquire oil and gas leases on a spread of 23,040 acres in Andrews and Ector counties, has sold a three-eighths interest in the option for $6,000,000.

Purchasers are Texas Eastern Production Co., which obtained a quarter interest for $4,000,000, and Forest Oil Corp., which paid $2,000,000 for an eighth. Lowe retains an eighth interest. Magnolia Petroleum Co. purchased the other half interest from Lowe in 1951.

In addition to the cash payment of $6,000,000, Lowe will receive $500 per acre from one-sixteenth of any production developed in the spread.

The option covered acreage in the "C" Ranch, also known as the Midland Farms area.

Byrd-Frost Sells Stock

DALLAS.—Byrd-Frost, Inc., has sold 40 per cent of its stock to Three States Natural Gas Co., an affiliated company. D. Harold Byrd, president, said the sale was designed to strengthen Three States, of which he and his partner, Jack Frost, are directors.

Lube-Oil Capacity Gains

Domestic capacity stood at 171,175 bbl. on January 1, up 14.7 per cent in 2 years, PAD survey-based estimate shows

WASHINGTON. — Domestic capacity for the production of finished lubricating oil increased 21,914 bbl. per calendar day in 1950-51 and is estimated by the Petroleum Administration for Defense to have totaled 171,175 bbl. daily by the first of this year.

The figures were derived from a survey conducted in mid-1951, results of which have just been tabulated. Much of the information developed by the study was withheld for administrative or security reasons.

Biggest increase . . . The tabulations showed that the greatest increase in capacity during 1950 was for oils with a viscosity index between 76 and 95 (up 12 per cent), while in 1951 the greatest increase was for oils with a V.I. between 65 and 75 (up 8 per cent).

During the 2-year period the capacity per calendar day increased from 50,826 to 57,231 bbl. for oil of less than 65 V.I.; from 13,709 to 16,213 bbl. for oil of 65-75 V.I.; 32,729 to 38,449 bbl. for oil of 76-95 V.I., and 51,997 to 59,282 bbl. for oil above 95 V.I.

The greater part of the over-all capacity increase was in solvent refining, which rose between January 1, 1950, and January 1, 1952, from 89,162 to 105,467 bbl. daily, while conventional refining capacity increased only from 60,099 to 65,708 bbl.

Classification of capacity by viscosity showed increases as follows: Nonviscous neutrals (light-viscosity oils having a Saybolt Universal Viscosity at 100° F. below 100 seconds), from 16,004 to 18,454 bbl. per calendar day; neutrals (light to medium-viscosity refined oils having a Saybolt Universal Viscosity at 100° F. of 100 to 450 seconds), 87,949 to 99,879 bbl.; bright stocks (fully refined stocks having a Saybolt Universal Viscosity at 210° F. of 145 to 210 seconds—used mainly for blending with neutrals to make commercial oil, although some are used by themselves as special lubricants), 27,305 to 31,016 bbl.; others, including heart cuts (oils with a short boiling range and a specified viscosity) and steam-cylinder stocks (oils of high viscosities above the bright-stock range), with heart cuts accounting for the largest volume in this classification, 18,003 to 21,826 bbl.

UNITED STATES WAX PRODUCTION

	1950	First quarter 1951
Crude unrefined wax (slop wax) sold as such, B./C.D.	4,718	6,274
Fully refined wax below 145° F. melting point, lb./mo.	57,704,190	65,512,747
Fully refined wax above 145° F. melting point, lb./mo.	10,258,833	12,491,761

End uses . . . A survey of end uses showed that in the first quarter of 1951 the automotive industry took 27.8 per cent of the total lubricating-oil shipments of refiners, with aviation taking 1.2 per cent, and other industries 25.2 per cent. About 20 per cent was exported, and bulk sales accounted for the remaining 25.6 per cent.

Wax production from the refining of lubricating oils in the first quarter of 1951 included 6,274 bbl. per calendar day of crude unrefined wax (slop) sold as such; 65,512,747 lb. per month of fully refined wax below the 145° F. melting point, and 12,491,761 lb. per month of fully refined wax above the 145° melting point.

The 1950 consumption of chemicals required for the production of lubricating oils, excluding sulfuric acid, was placed at 10,545,560 lb. per month. However, PAD said this figure was somewhat distorted because it does not include all initial fills for the year in all refineries.

The consumption during the first quarter of 1951 was placed at 9,655,702 lb. per month, but the report showed that (assuming plant operations at normal capacity) the requirements would have been 10,251,811 lb. per month.

Salient features of the survey are shown in the accompanying tabulations.

U. S. Lube-Oil Capacity* Classified by . . .

. . . V. I. Level

Date—	Less than 65 V.I.	% inc.	65-75 V.I. (incl.)	% inc.	76-95 V.I. (incl.)	% inc.	Above 95 V.I.	% inc.	Total
Jan. 1, 1950	50,826		13,709		32,729		51,997		149,261
Jan. 1, 1951	53,564	5.4	15,009	9.5	36,648	12.0	55,927	7.6	161,148
Est. Jan. 1, 1952	57,231	6.8	16,213	8.0	38,449	4.9	59,282	6.0	171,175

*Barrels per calendar day of finished lubricating oil.

. . . Viscosity of Product

Date—	Nonviscous neutrals	% inc.	Neutrals	% inc.	Bright stocks	% inc.	Others†	% inc.	Total
Jan. 1, 1950	16,004		87,949		27,305		18,003		149,261
Jan. 1, 1951	18,209	13.7	93,243	6.0	29,739	8.9	19,957	10.9	161,148
Est. Jan. 1, 1952	18,454	1.4	99,879	7.1	31,016	4.3	21,826	9.4	171,175

†Heart cuts, steam cyl., etc.

. . . Type of Refining

Date—	Conventional refining capacity	% inc.	Solvent refining capacity	% inc.	Total
Jan. 1, 1950	60,099		89,162		149,261
Jan. 1, 1951	63,126	5.1	98,022	9.9	161,148
Est. Jan. 1, 1952	65,708	4.1	105,467	7.6	171,175

Heating-Oil Ruling Delayed

WASHINGTON.—A decision on an increase in price ceilings for heating oils on the Atlantic Coast is expected to be reached by the Office of Price Stabilization by June 10.

Whether the increase will be the full 1.2 cents per gallon generally believed to be under consideration has not been made clear, but OPS officials have indicated they will keep the raise to the barest minimum they believe necessary to maintain East Coast supplies, and, if any change in circumstances thwarts that effect, will expect the industry to pick up the tab as it did last winter.

WATCHING WASHINGTON

Bertram F. Linz

Refiners Hurting, Too

Oil producers complain that in fixing ceiling prices the Government doesn't give sufficient weight to the increased cost of finding new oil—that's replacement cost. But refiners and manufacturers generally complain that in fixing taxes the Government doesn't give sufficient weight to the increased cost of new equipment—that's replacement cost, too.

The manufacturers' situation has not been publicized as efficiently as that of the oil producers, possibly because there's no Russell Brown to talk for the refiners. But it's tough, especially for the small refiner who wants to keep his plant modern and efficient.

This is what happens. The Treasury requires that industrial equipment be charged off at cost, and costs only a few years ago were much less than they are today. So when a manufacturer has to replace anything, from a wrench to an entire unit, he finds his depreciation fund for what he is replacing doesn't go far.

Manufacturers complain this wouldn't be so bad if they could set aside sufficient funds to supplement their depreciation money, but taxes cut too deeply. It isn't just a gripe over high taxes—the Machinery and Allied Products Institute made a study and discovered that American corporations are running $4 billion a year short of what they should set aside for replacement and improvement.

Leaky Tankers

Something appears to be definitely wrong with the T-2 tankers built in the latter days of the war.

This was disclosed by ship repairmen who told the National Production Authority they would need some 5,000 tons of steel and 500 to 600 tons of rivets a month over a considerable period to stiffen between 300 and 350 tankers to protect them against conditions of low temperature and heavy seas.

A longitudinal-stiffening program for T-2 welded tankers was established by the American Bureau of Shipping and the U. S. Coast Guard following the discovery that some of the vessels, many of which are between 7 and 9 years old, had developed structural weaknesses, including complete severance of the hulls in 2 instances.

Oil Can Handle It

Use of raw materials derived from petroleum for the production of organic chemicals has increased about 60 times since 1930, but there is no indication that this trend ever will progress to the point where it hastens the depletion of our petroleum reserves.

As a matter of fact, if all organic chemicals were made from petroleum, the total annual tonnage of oil needed would amount to less than 2 days' domestic production at current rates. Actually it is only slightly over half this figure today.

Venezuela Obstinate

Negotiations for a new reciprocal trade agreement with Venezuela are not progressing too favorably, it is indicated in reports reaching Washington.

The Venezuelan Government wants the present trade-agreement import tax on oil reduced to 5¼ cents per barrel and elimination of the quota system. It appears unwilling to consider any compromise. Under the present agreement, a rate of 10½ cents per barrel is applied to imports of crude and fuel oils up to 5 per cent of domestic crude runs and the original tax of 21 cents per barrel is imposed on imports over the quota.

United States negotiators have attempted to point out that there are factors to be considered other than the natural desire of Venezuela to have the American market opened to a maximum of oil at a minimum of tax. Imports from Venezuela in 1950 and 1951 exceeded 107,000,000 bbl. a year and her current quota is approximately 70,400,000 bbl. The government is a partner in the business, and it is easy to figure the benefits that would accrue from a 5¼-cent tax and no quota. It is also easy to figure the advantages that would go to other producing countries—Colombia, the Netherlands, the Middle East, and, as development expands, Canada.

Charges Countered

Arnall terms industry's decontrol position absurd

WASHINGTON. — Industry charges that crude-oil price ceilings have operated against the expansion of production were challenged last week by Price Stabilizer Ellis G. Arnall.

Countering with a charge that some in the industry want decontrol "because they expect that without controls they could get higher prices," Arnall told the House banking committee no facts have been submitted to the Office of Price Stabilization to indicate that any general increase in the price of crude is necessary.

"Complaint absurd" . . . "A mere glance at the facts in this case will disclose the absurdity of the complaint," Arnall declared.

"The facts are that in 1951, under price control, a record addition was made to our reserves of petroleum; at the end of 1951 known crude-oil reserves were the highest in history; a record number of new wells was drilled last year despite shortages of steel and drilling equipment; indications are that the number of new wells drilled in 1952 will substantially exceed the number of new wells drilled in 1951; profits in the petroleum industry, even after taxes, probably have never been higher.

"In addition, all demands for crude petroleum are now being met, and we are producing at substantially less than capacity. Stocks of crude oil above ground increased in 1951 beyond expectations, and these stocks have further increased in 1952."

Arnall made it clear that OPS would not raise ceiling prices, in view of this situation, unless forced to by some amendment to the Defense Production Act, which the committee now is considering.

More Materials Sought

WASHINGTON.—Considerably increased allocations of steel, copper, and aluminum for use by the oil and gas industry in the fourth quarter are being sought from the Defense Production Administration by the Petroleum Administration for Defense.

Major beneficiaries of the increased supply would be the domestic operators who would get, among other materials, 40,800 tons more of carbon-steel, oil-country tubular goods for production operations and 17,625 tons more of alloy-steel oil-country tubular goods for MRO.

Tubular Goods Allotted

WASHINGTON. — Supplemental and conversion allotments of 147,194 tons of oil-country tubular goods have been made by the Petroleum Administration for Defense to 591 oil and gas operators for third-quarter use.

With the primary allocation of 265,476 tons and the 22,200 tons set aside in field stocks for wildcat drilling, this brings to 434,870 tons the amount of casing and tubing authorized by PAD for third-quarter operations.

The 147,194 tons allotted represents a little more than 25 per cent of the 540,812 tons of tubular goods sought in applications filed by 721 operators, 130 of which had to be denied.

Even with the allotment of all the steel PAD could squeeze out of the allocation given it by the Defense Production Administration, retiring Deputy Petroleum Administrator Bruce K. Brown said, the oil and gas industry will still be some 25,000 tons short of meeting its full calculated requirements for the third quarter.

However, Brown explained, "it would do little good to issue tickets for tubular goods that the mills won't produce."

CANADA

Big Alberta Take

Crown lease sale brings in $12,881,436 for new mark

EDMONTON, Alta.—A record $12,881,436 was raked in by Alberta government in its most recent auction of crown oil-lease reservation rights.

This compared with the previous high of $9,122,175 for a single auction on February 16, 1950.

Since the province inaugurated the policy of letting oil reservations go to the highest bidder in 1948, it has obtained more than $100,000,000 in oil revenue.

Top quarter bid . . . Besides establishing a record for the total revenue to the government, the auction set a new high for price paid for a quarter section of reservation rights. Texaco Exploration Co. bid $3,110,000 for one quarter section and $2,100,500 for a second in the fast-developing Bonnie Glen sector, about 40 miles southwest of Edmonton.

The previous high for a single quarter was established June 29, 1950, when Crown Trust Corp. paid $1,853,333 for 160 acres in Redwater field.

Bonnie Glen oil field, discovered by Texaco this year, is about 5 miles south of Wizard Lake, where the same company brought in last year's outstanding oil discovery.

The discovery well at Bonnie Glen found 698 ft. of D2 and D3 pay, for the thickest oil-saturated reef buildup in Canada. There are at present four wells in the field. At nearby Wizard Lake there are 20 wells.

Heavy Armena bids . . . Close to $2,000,000 was paid for three quarter-sections in the Armena Viking sand area, 30 miles southeast of Edmonton Albermont Petroleums, Ltd., paid $707,607, British-American Oil Co. $602,195, and Punch Petroleums, Ltd., $557,117 for respective quarter-section rights in this field.

Other bids were concentrated in the Redwater, Stettler, Camrose, Leduc, and Golden Spike areas.

Texaco Exploration Co. actually held reservation rights on its high-priced purchase in 1946 but at the time did not drill. Later, when the company discovered oil at Bonnie Glen, the property had to be turned back to the government for competitive bidding.

Devon Plant Expansion Set

EDMONTON, Alta.—Imperial Oil, Ltd., has announced it will expand its natural-gasoline plant at Devon, about 20 miles southwest of Edmonton, to process a top volume 24,000,000 cubic feet of natural gas daily.

The plant, built at a cost of $5,500,000 in 1949, originally was designed to handle a maximum of 17,000,000 cubic feet daily. It is situated in the Leduc-area oil fields, where there now are about 900 producing wells. Gas is processed to yield propane, butane, and pentanes. Increased development and expanded crude-oil markets were given as the reasons for the expansion.

In this connection, oil purchasers of Alberta crude have requested about 186,000 bbl. daily, compared with 168,000 bbl. for August of last year when the midsummer peak was reached. It is estimated that the figure will rise this summer to 200,000 bbl. daily.

First Glass Tubing String Run in Well

Bill Edwards, Superior Oil Corp., Houston, examines a coupling on the first string of Fibercast tubing to be run in a salt-water disposal well, near Jennings, La. The new-type tubing is composed of 35 per cent glass fiber by weight and 65 per cent liquid thermosetting resin. To Edwards' left are A. F. Carpenter, assistant production superintendent in Louisiana for Superior; Ivan Rice, head of Rice Engineering Co., Chase, Kans., consulting firm; and Bob Shackelford, general manager of Perrault Bros., Tulsa, which manufacturers Fibercast tubing and line pipe. The 3½-in. tubing run in the Louisiana well is noncorrodible, weighs only 37.5 lb. per 20-ft. length; has an internal bursting factor of 300 psi. and an external crush strength of 500 psi.; and has a rated tensile strength of 7,000 psi.

IN THIS ISSUE

Another Journal Insert Map . . .

. . . Showing the location of all refineries in the United States. With the map is a list of refineries, broken down according to PAD districts and states, showing crude-oil charging capacity of each refinery.

ECONOMICS

Demand Trend Still Up

Knight says long-term forecast is 3 per cent increase each year; next 2 years expected to be somewhat higher

TULSA.—Increases in demand for petroleum products during the next 2 years are expected to be greater than the long-term average but less than during the last 2 years.

This was the prediction of E. T. Knight, economist for Atlantic Refining Co., in a speech before the Lubrication Committee of American Petroleum Institute here last week.

The first factor in appraising the future operations of the domestic oil industry, he said, is the relative effect of general economic conditions on future increases in demand for petroleum products.

Between 1946 and 1951, domestic demand rose more than 2 million barrels daily, an average of 7.5 per cent a year compared with annual gains of 5.2 per cent for total industrial production and 3.8 per cent for real gross national product.

Growth factors . . . "The petroleum industry's differential growth was due chiefly to the large pent-up demand at the end of the war for automobiles, oil burners, and other oil-using equipment," Knight said.

"As nearly as we can tell from available statistics and surveys, currently, there is no pent-up demand for equipment, and future increases in consumption for transportation, residential, and commercial use will be geared to normal annual increases in the oil-using units, modified both by increased operation of some units and by greater efficiency in use. Over the long term, 20 to 25 years, increases in demand may be expected to average somewhere in the neighborhood of 3 per cent a year."

The second factor in the growth of the industry is the necessity for expansion of producing, processing, and distributing facilities at rates greater than the prospective increases in demand. This need is the result of present world conditions and the necessity to be prepared for any future emergency.

"Published estimates of various industry and government groups indicate that a desirable reserve capacity in production, refining, and transportation facilities might range from 15 to 25 per cent of consumption," he said. "On this basis, from one to two million barrels a day of reserve capacity would be necessary by the end of 1953."

Money needs . . . On methods of financing the needed expansions, Knight called attention to the fact that additional facilities to meet a 30-year increase in demand of about 5.5 million barrels daily have been financed largely by self-generated funds. However, during that period, the oil industry earned on an average, and in nearly every year, a lower rate of return on its investment than manufacturing industry as a whole.

"The ability of the industry to finance this reserve capacity will depend directly on the adequacy of current and future profits," Knight said.

The accompanying table shows forecast of demand and supply for 1952 and 1953. The forecast assumes that no solution to the Iranian problem will be reached during the period.

UNITED STATES DEMAND AND SUPPLY
(Thousands of barrels daily)

	1951 actual	1952 forecast	Per cent change from 1951	1953 forecast	Per cent change from 1952
Domestic demand:					
Motor fuel	2,987	3,220	7.8	3,383	5.1
Middle distillate	1,569	1,721	9.7	1,845	7.2
Residual fuel	1,545	1,589	2.9	1,613	1.5
Lubricants	116	120	3.5	123	2.5
All other	827	871	5.2	914	4.9
Total	7,044	7,521	6.8	7,878	4.8
Exports	423	350	—17.3	273	—22.0
Total demand:					
Motor fuel	3,098	3,306	6.7	3,446	4.2
Middle distillate	1,650	1,791	8.5	1,895	5.8
Residual fuel	1,624	1,655	1.9	1,659	0.2
Lubricants	164	160	—2.4	158	—1.2
All other	931	959	2.9	993	3.5
Total	7,467	7,871	5.4	8,151	3.6
Stock changes	+89	+22		+33	
Required new supply	7,556	7,893	4.5	8,184	3.7
Crude production	6,149	6,387	3.9	6,592	3.2
Natural gasoline, etc.	564	605	7.3	628	3.8
Imports	843	901	6.9	964	7.0

Product Exports Rise

WASHINGTON.—Product exports moved upward during the week ended May 2, averaging 215,800 bbl. daily against 162,100 bbl. daily in the preceding week, according to figures released by the Petroleum Administration for Defense.

Shipments of gasoline, both aviation and motor, dropped sharply but the movement of other products increased substantially, residual hitting a new high for the year to date.

Details of the week's movement, compared with the preceding week, and averages for the 4 weeks ended May 2 are shown in the following table in thousands of barrels daily:

	Week ended		Average
	May 2	Apr. 25	4 weeks
Aviation gasoline	11.7	35.4	32.7
Motor gasoline	4.8	10.6	15.0
Kerosine	19.7	5.4	18.3
Distillate	67.2	36.2	73.5
Residual	112.4	74.5	86.5
Total	215.8	162.1	226.0

New Water-Vapor Test

Direct chemical method for determining vapor in natural gas reported accurate to plus/minus 1.2 lb. per M.M.c.f.

George Weber

NEW YORK.—A new procedure for determining water vapor in natural gas by a direct chemical method received considerable attention last week as engineers and chemists met here for the American Gas Association's annual Production and Chemical Conference.

Information on the vapor test, which was developed primarily for referee use where conventional methods fail to give definite and reproducible results, was presented by Willard F. Brickell, of United Gas Corp.'s research department.

The method involves total absorption of water vapor by ethylene glycol, followed by titration of the absorbed water with Karl Fisher reagent. Accuracy on the order of plus or minus 1.2 lb. of water per million cubic feet of gas is obtained at both low and high pressures.

The chemical method is applicable where others are limited. For example, the Bureau of Mines dew-point test, while considered the standard method for determining water vapor in natural gas, does not apply to a gas whose dew-point is not lower than the temperature at which other component vapors condense. Further, it cannot be used with accuracy on a gas that contains vapors of glycols or glycol amines. Importance of the basic reference method is enhanced by the increased use of these glycols and glycol amines.

Pipe-line deposits . . . An interim report presented by L. T. Bissey of the Division of Petroleum and Natural Gas Engineering, Pennsylvania State College, revealed progress on a study of gas pipe-line deposits.

Supported by the Pennsylvania Natural Gas Men's Association, the investigators have made considerable headway on the first objective of the dual study, which entails tracing the origins of natural-gas pipe-line deposits and determining preventive measures.

Samples of deposits or dusts, sent in by member companies of the association, were analyzed by physical and chemical means.

Deposit sources . . . Although incomplete, the study shows evidence that these deposits arise from the following sources: (1) formation or well; (2) construction dirt, and (3) mill-scale and internal corrosion of the pipe-line system.

Both the chemical and mineralogical analyses showed the products of the oxidation of iron as the principal constituents.

In addition to magnetite, or mill-scale, which is introduced with the pipe or other iron apparatus in the system, other oxides were identified as hematite, goethite, and limonite. These latter appear to result from internal rusting of the pipe-line system.

All of the factors necessary to cause rusting (i.e. oxygen, carbon dioxide, and water) are present in natural-gas pipe lines. Although their per cent by volume may be very small, under high pipe-line pressures, the weight of these constituents per cubic foot becomes significant, Bissey said.

Identification and source determinations of the deposits will continue, following which, protective or preventive measures will be studied and recommended.

Strike Effects Fade

Controls on products lifted as refineries go on stream

GRADUAL settlement of the oil strike which began April 30 had put back into operation the bulk of the refineries and other installations by the end of last week and it appeared that local agreements would be reached soon at the relatively few plants still negotiating new labor contracts.

Resumption of operations was sufficient to remove all fear of consumer shortages of petroleum products except aviation gasoline.

It may be some months, however, before all effects of the shutdown will be erased and operations throughout the industry return to prestrike levels. Crude production is expected to be somewhat curtailed for a good many weeks until stocks of crude oil are worked down to normal levels.

In Washington the Petroleum Administration for Defense revoked all inventory and export restrictions imposed during the strike on automotive gasoline and burning oils.

Controls on the consumption of aviation gasoline were lifted, effective June 3, in a surprise move by Interior Secretary Oscar L. Chapman.

The action came only 5 days after Chapman had announced the restrictions would be continued until June 16, although with some increase in permissible consumption.

Chapman explained that when the extension order was issued some 50,000 bbl. daily of aviation-gasoline capacity still was shut down. Since then a number of wage disputes on the Gulf Coast have been settled, he said. Even if no further agreements are reached, he added, 90 per cent of the nation's capacity will be in operation by June 3.

Chapman was particularly eager to revoke the order because it severely affected international air travel, now approaching its seasonal peak.

Earlier the interior secretary had warned that even after all avgas facilities were back in operation there would be a lag until they began shipping finished aviation gasoline. The supply position, he said, would continue tight even longer.

Oil Properties Sold

NEW YORK.—Acquisition of all the operating oil properties of Case, Pomeroy & Co., Inc., by American Maracaibo Co. through a stock exchange has been approved by stockholders of American Maracaibo.

HADLEY CASE

Hadley Chase, president of Case, Pomeroy since 1946, has been elected president of American Maracaibo succeeding Frederick R. Ryan, and Harry A. Richards, Case, Pomeroy vice president, is a new director.

Actual consummation of the merger has been blocked by court action by two minority stockholders of American Maracaibo, but William M. Chadbourne, American Maracaibo board chairman, said the company hopes to clear up the opposition at an early date.

The stock of three Case, Pomeroy subsidiaries is involved in the transaction. They are Case, Pomeroy Oil Corp., a pioneer producer and waterflood operator in Bradford, Pa., field which now has royalty interests in the Southwest and engages in pipe-line construction in Pennsylvania; Felmont Oil

Corp., with exploration and production in Kentucky, including water repressuring near Owensboro; and Montoya Oil Co., Inc., which holds royalty and lease interests in the Southwest.

American Maracaibo has a carried interest in Guampa field in Venezuela and in the Barco operations in Colombia, plus working interest and royalty in West Texas.

ernments and the heads of oil companies to attend the oil show next spring. As a young man Governor Murray worked for several years in the oil operations of Argentina and Bolivia.

GROUP-SESSION SPEAKERS at the meeting of the A.P.I. lubrication committee in Tulsa last week included, left to right, A. B. Boehm, Enjay Co., Inc.; H. C. Mougey, General Motors Corp.; E. T. Knight, Atlantic Refining Co.; M. D. Gjerde, Standard Oil Co. (Ind.); and D. F. Hollingsworth, E. I. du Pont de Nemours & Co., Inc. Not shown is R. W. McDowell, Mid-Continent Petroleum Corp.

Lube-Oil Problem

Change in designations will require education of users

TULSA.—Refiners and car manufacturers are confronted with the problem of educating motorists on the new motor-oil classification designations developed by the American Petroleum Institute's lubrication committee.

The new classification system, approved by the A.P.I. board of directors April 29, includes five types of motor oils *(The Oil and Gas Journal, May 19, page 178)*.

Addressing the lubrication committee here last week, H. C. Mougey, General Motors Corp., warned the members that an extensive educational program must be launched at once.

Emphasizing the time and work involved in replacing the present nomenclature by the new A.P.I. system, Mougey said the only way the new system can be put into effect is for the oil and automotive industries to start using it and to start an educational program.

Adoption of the new classification system for motor oils has, in effect, placed full responsibility on the refiners for oil composition along with the responsibility they already have on oil performance, A. Bruce Boehm, of Enjay Co., Inc., told the committee. This responsibility, he said, is sound.

M. D. Gjerde, Standard Oil Co. (Ind.), explained that the new designations replace the old "regular," "premium," and "heavy-duty" designations. Gjerde further explained that the new system provides a means for the automotive industry to indicate to the refiner requirements of engines and that it permits the refiner to develop motor oils of most suitable performance quality for the service intended.

"The favorable reactions to the new classifications expressed by representatives of leading automotive manufacturers who cooperated in their development justifies the assumption that they will support them," Gjerde said. "However," he added, "the degree and expediency with which they will do so will depend upon the enthusiasm and thoroughness with which the classifications are adopted by the oil industry, itself."

Trip to Advertise I.P.E.

Gov. Johnston Murray of Oklahoma will visit more than a dozen countries of South and Central America and the Caribbean region during August to promote interest in the International Petroleum Exposition to be held in Tulsa May 14-23, 1953.

He will accompany Dr. Oscar B. Irizarry, editor of Petroleo Interamericano, Tulsa, who has been commissioned by the exposition directors to present official invitations to the gov-

MID-CONTINENT

Kansas Allowables Studied

WICHITA, Kans.—The conservation division of the Kansas Corporation Commission here has under study a proposal to modify crude-oil allowable allocations on a depth-allocation basis for the deep oil and gas reservoirs underlying the shallow Permian gas pays in the Hugoton area of southwestern Kansas.

The plan would set up a series of continually increasing allowables as the depth to the pay increases. Depth-allocation brackets would be set up for intervals of 500 ft.

Commission adoption of the plan would encourage development in the Pennsylvanian and Mississippian formations now producing at depths ranging from about 5,000 to 7,000 ft. in Clark, Liberal, Meade, and Morton counties. Lansing-Kansas City lime series, Marmaton limestones, and the Morrow sandstones produce from the Pennsylvanian system in southwestern Kansas. The Chester and the Meramec limestones of the Mississippian system also are productive in that region designated as the Hugoton embayment of the Anadarko basin.

The Kansas proposal may follow a similar plan established by New Mexico's Oil Conservation Commission about 1945 when it set up a depth-allocation incentive for the pre-Permian formations in the southeastern part of that state. This plan has encouraged the development of a number of deep Pennsylvanian, Mississippian, Devonian and Ordovician reservoirs in Lee and Chaves counties.

Flood Tour This Week

BARTLESVILLE, Okla. — Annual spring tour of the Kansas - Oklahoma Water Flood Operators Association, the Kansas section of the American Institute of Mining and Metallurgical Engineers, and the Northeast Oklahoma Oil Producers Association will be held June 4, starting at Nowata City Park. The groups will visit Forest Oil Corp. Flood 27, Delaware Consolidated Oil Co. Delaware project, Pure Oil Co. Robbins-Fister project, and the Sinclair Oil & Gas Co. Security flood.

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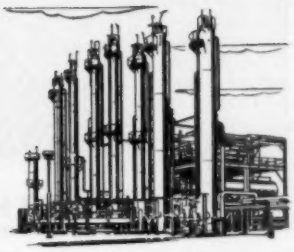

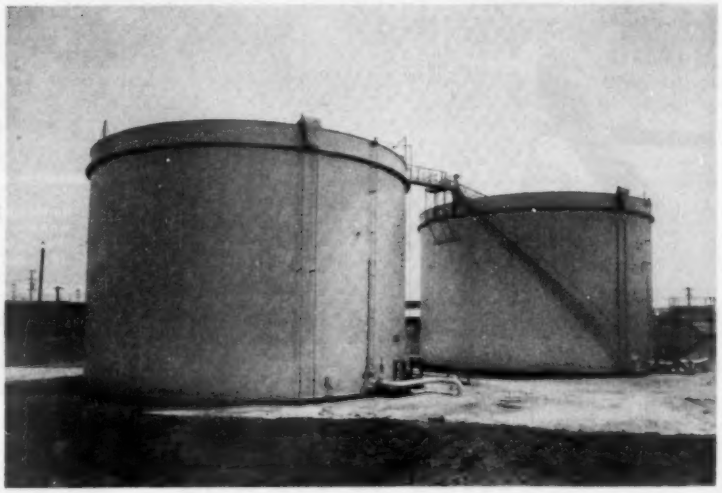

THE two 25,000-bbl. Horton tanks shown above at Vernon, California, are working for the General Petroleum Company. Gasoline is delivered to them by pipe line from the nearby Torrance refinery—stored briefly—and then supplied to a loading rack for distribution to the Los Angeles area. A huge gasoline demand in this highly motorized city requires the tanks to be filled and refilled many times. This means costly evaporation losses unless modern storage equipment is used.

That's why the two storage tanks are equipped with Horton Floating Roofs. By riding directly on the liquid in the tank, Horton Floating Roofs eliminate the space where air-vapor mixtures might form. Elimination of the vapor space means that there is no air-vapor mixture to be displaced by expansion or filling. Profits don't disappear into thin air. In addition, corrosive action is minimized by preventing air from coming in contact with the underside of the roof plates.

For more information about either Horton Double-Deck, Pontoon or Pan Floating Roofs for efficient working storage of crude oil and motor gasoline — Hortonspheres — Hortonspheroids — Hortondome Roofs — Hemispheroids — Horton Vaporspheres — flat bottom tanks — pressure vessels — refinery towers — or elevated water tanks — write to our nearest office. Our four strategically located plants always stand ready to serve the needs of the petroleum industry.

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Houston, 2.....2119 C & I Life Bldg.
Los Angeles, 17...1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3...1615-1700 Walnut Street Bldg.
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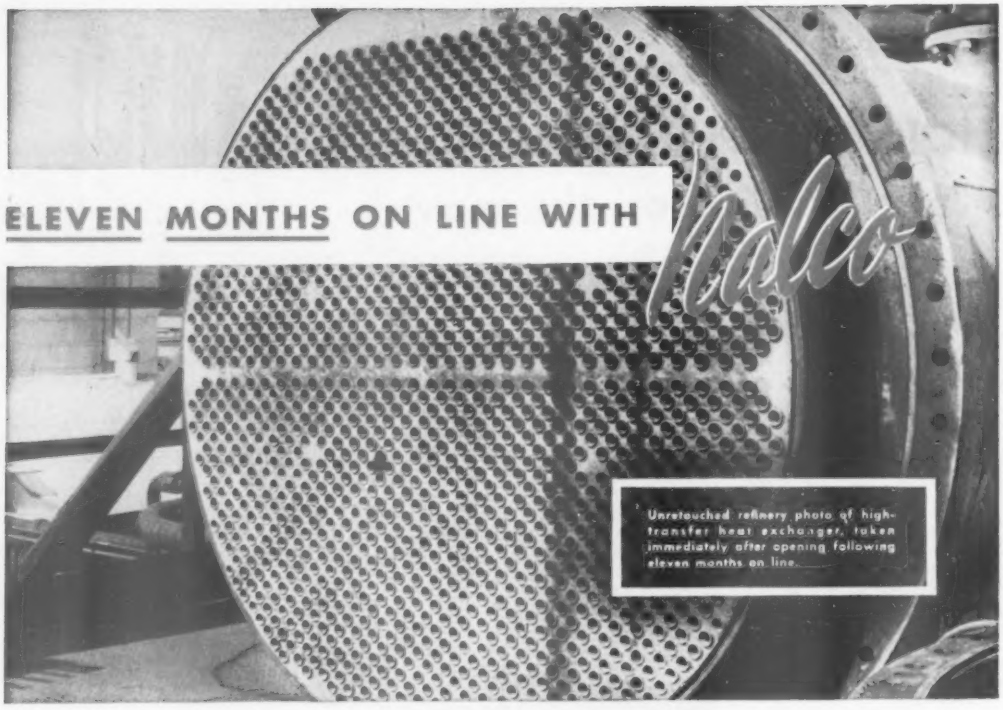
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RED OIL PORT is that at Constanza, Romania, on the Black Sea, which funnels petroleum from Eastern European countries into Russia.

Iron-Curtain Report

Sound policies ignored as eastern Europe moves to step up production; oil substitutes pushed for civilian use

George G. Rosu

THE importance of the eastern European countries now under Russian occupation stems from the fact that nearly 87 per cent of the petroleum output of continental Europe is originating from this area.

The best producing, as well as potential, fields are located in these countries where actual or rationed consumption of oil products is less than half of their cumulative production.

The oil activity going on in this sector is, however, surrounded with a growing opaqueness. Since 1950, in particular, the percentages mentioned in the quarterly or annual reports on target fulfillment are increasingly silent with regard to liquid fuel, or their langauge is becoming more obscure. Apparently petroleum has become as important a link in the Russian strategic plans in that area as, for instance, is the strength and location of the military units.

Policy changes . . . Last year petroleum activity was characterized by two main features: (1) Repeated curbing of civilian consumption (including tractors and motor vehicles) and initiation of long-term fuel-saving programs; (2) an upward revision of already-ambitious production targets in the producing countries, regardless of shortages of certain types of equipment, the danger of quick exhaustion of known deposits, high production costs, and other obstacles.

Revision of production goals suggest that the satellite governments have decided to disregard the rather cautious planning of the past and to follow an almost irresponsible pattern.

The new planning policy coincides with the start of the war in Korea. Petroleum, together with coal, heads the list of items whose production must be particularly speeded up. Geological and drilling activities have been intensified and production is proceeding everywhere at a maximum and in disregard of normal conservation standards.

Parallel with the implementation of these programs, the satellite governments are concentrating all available resources behind plans aimed at achieving a lasting substitution of petroleum in domestic consumption. Coal and lignite production and consumption are slowly rising, while electrification programs are making noticeable headway, although here, too, economic consideration has often had to be disregarded.

Last year's record . . . For the petroleum industry, 1951 was a year of tremendous efforts but meager results.

With practically no imports of equipment from the West, the occupied countries, themselves, produced for the first time much of their own equipment. The Russians helped, mostly with blueprints, models, and technical advice.

The results, however, were anything but encouraging. With the exception of Czechoslovakia, the countries lack specialized facilities and technicians for producing oil-field equipment. In Romania and Hungary, for instance, pipe of only 2 to 6-in. size can be produced. The equipment items produced have been necessarily of a low quality. The result is an abnormally high frequency of breakdowns and stoppages.

These conditions also are the consequence of the lack of technical supervisors and skilled workers, particularly in Romania, and of poor working conditions in the field. Lack of labor-saving machinery has made necessary the employment of more semiskilled and unskilled manpower.

Official attention is focused upon the fulfillment and surpassing of fixed norms and zealous application of "Soviet working methods," and is less concerned with safety. Such circumstances explain the great number of accidents.

Exploratory activity . . . During recent years, exploration activity has been concentrated especially in the Pannonian and Vienna basins.

Yet, prospecting work is being carried on throughout the entire satellite

PRODUCTION AND CONSUMPTION IN EASTERN EUROPE IN 1951
(All figures in thousands)

	Production				Approx. consumption	
	Crude oil		Synthetic fuels			
	Metric tons per year	Bbl. daily (approx.)	Metric tons per year	Bbl. daily (approx.)	Metric tons per year	Bbl. daily (approx.)
Romania	4,948.6	99.0			1,400	28.0
Eastern Austria	2,100	42.0			300	6.0
Eastern Germany			1,084	21.7	350	7.0
Hungary	450	9.0			400	8.0
Czechoslovakia	85	1.7	250	5.0	780	15.6
Poland	182.7	3.7	40	0.8	650	13.0
Albania	190	3.8			18	0.4
Bulgaria					140	2.8
Total	7,956.3	159.2	1,374	27.5	4,084	80.8

About the Author

The article presented here is the first of a series prepared for the Journal by George G. Rosu on the little-known operations of the petroleum industry in the Russian-controlled countries of eastern Europe.

The author studied at the universities of Bucharest, Berlin, and Paris, and holds doctorate degrees in economics and law.

He was an assistant professor in the Institute of Economics of the University of Berlin and, until 1947, economic counsellor of the Romanian Ministry for Foregn Affairs. In this capacity he was in charge of the legal and political postwar problems of the Romanian petroleum industry. Much of his knowledge of the European petroleum industry was gained during assignments as commercial attache in Berlin and on missions to other countries.

The author plans to publish soon a study on petroleum, coal, and electric power in the Soviet-occupied areas and a monograph of the Hungarian oil industry.

His second article will describe the current situation and outlook in each of the countries of eastern Europe, and the third will be devoted to the area's production of synthetic fuels.

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area: alongside the Oriental Carpathian range, in Banat, east of the Gbely-Hodonin line, even on the hopeless Bulgarian and eastern Germany structures.

However, with the exception of the discoveries south of the Danube in the Vienna basin, there have been no encouraging results capable of augmenting the slim reserves of the eastern European countries.

On the whole, drilling has been mostly in areas which were thoroughly surveyed earlier. In this category are included the Banat and Totkomlos-Korosszegapaty regions, both intensively surveyed between 1940 and 1944. The same is true of the western and eastern Slovakian structures and also the Vienna basin, where several holes had been drilled as early as 1936.

In other words, until the present day, the Russians have been reaping benefits of pioneer work carried out by foreign corporations prior to 1939, as well as of German discoveries and accomplishments done until late in 1944.

Organization . . . Since late in 1950, the petroleum industry in each producing country has been organized into five to seven trusts, according to the Soviet model.

These are in charge of the prospecting, exploration, development, processing, distribution, transportation, equipment and repair, and even of personnel and cadre questions. In turn, these trusts are attached, and responsible, to the respective Soviet state trusts.

In this way, the entire activity—including marketing of oil products within the satellite area—is centrally directed and controlled. This streamlining helps substantially to curb the satellite consumption of oil products, thus creating greater surpluses for export to Russia.

Refining . . . Total refinery output in eastern Europe is unknown and cannot be easily established.

In view of the level of technical knowledge and general working conditions of the area, however, an estimate may be arrived at by deducting 15 per cent of total crude-oil production as losses and refinery fuel (See table).

Consumption trend . . . The per capita consumption in 1951 averaged 10.5 gal., which is slightly below the prewar level. This figure is only a fifth of the average consumption in western Europe and less than half of that in Portugal, which is last among western European countries.

This apparent consumption reflects, on one hand, the shortage of liquid fuel in the Russian sphere and, on the other, the actual degree of industrialization and welfare of the satellite countries.

Civilian consumption in eastern Europe may rise during the coming 3 to 4 years as a result of unavoidable needs created by the planned industrialization, the increasing number of workers and the collectivization of agriculture.

If the number of tractors may be regarded as indicative, then the mechanization seems to be making progress. The satellite area's pool of tractors rose from 72,000 in 1950 to about 89,000 last year (to which is added the consumption of the 137,000 Russian tractors). By 1955, the eastern European countries plan to have altogether approximately 147,000 tractors. Bus and lorry transportation is scheduled to rise by 50 to 90 per cent over 1950.

Production outlook . . . Crude-oil output in Romania may remain, at best, stable.

Discovery prospects are very poor. No new structures have been found, and yield of existing wells is necessarily limited.

Production of old wells, as well as those which have recently been deepened or restored to production, may gradually diminish.

Lispe field in Hungary is doomed to a sure decline, while Albanian production, though modestly rising, is not able to affect materially the over-all balance.

The downward trend of Romania and Hungary may be offest to some extent by the promising South Danubian structure in eastern Austria, whose development thus far seems to be only in early stage. The Czechoslovak and Polish production is in the same category as Albania.

Synthetic-fuel production will go up, and will then stabilize at the levels planned for 1955. In all probability, the Russians will put the greatest emphasis on this program and on the Austrian field development.

These countries consume only 47 per cent of their cumulative production, and the present production level will cover the additional requirements generated by the planned industrialization and mechanization as well as a normal noncivilian consumption. Even if all the restrictions imposed today upon civilian consumption and private motoring were lifted, there would still be a surplus for export outside this area.

Russian outlook . . . The forceful shrinking of domestic consumption in these countries is the result of the Russian liquid-fuel shortage.

The over-all Russian picture seems to be rather uncomfortable. Crude production may have risen to 42,100,000 tons (842,000 bbl. daily) in 1951, to

TYPICAL RIG in eastern Europe is this walled-in rotary in operation in an old field in Poland.

REFINING PICTURE, 1951

	Metric tons (1,000)	Bbl. daily (1,000)
Net throughput (approx.)	6,750	135.0
Less exports to western Austria	600	12.0
Less bunker oil and exports to western Germany*	50	1.0
Balance of products remaining in area	6,100	122.0
Plus synthetic-fuel production	1,374	27.5
Total supply in 1951	7,474	149.5
Actual requirements	4,038	80.8
Other civilian uses and exports to Russia	3,436	68.7

*Polish imports from the sterling area were balanced with Romanian exports of fuel oil to England during the fall of 1951.

which was added the satellites' contribution of 3,400,000 tons (68,000 bbl. daily), giving a total of 45,500,000 tons (910,000 bbl. daily) of liquid fuels.

This was augmented by not more than 1,200,000 tons (24,000 bbl. daily) of synthetic fuel, produced mainly in the plants at Dsershinsk, near Gorki. (Some gas oil may have been produced at the Estonian shale deposits of Kokhtla-Yarve, although the quantity is too small to affect the over-all balance sheet.)

Against this production of 46,700,000 tons (934,000 bbl. daily) of liquid fuel is the minimum consumption of Russia of about 40,500,000 tons (810,000 bbl. daily). In addition, there are the commitments to China and consumption in Korea, as well as the preparations in Southeast Asia, which may be conservatively estimated at 4,500,000 tons (90,000 bbl. daily) in 1951.

The surplus of something over 1,500,000 tons, or about 30,000 bbl. daily, of liquid fuel is, indeed, not a reserve upon which to build adventurous plans.

A.I.O.C. Profits Off

Profits of Anglo-Iranian Oil Co., Ltd., dropped about 38 per cent in 1951 as a result of the expropriation of its properties in Iran.

Figures made public by the company in London show that last year's profits, before British taxes, amounted to £52,217,016 (about $146,200,000) in comparison to £84,466,342 ($236,500,000) the previous year.

Royalties of £8,326,446 ($23,300,000) were deducted from gross revenue as provided in the 1933 concession agreement. Exports halted in Iran late in June 1951, and the company's staff subsequently was forced out.

C. CLEVERLY

A. TRANTOR

D. FRASER

L. GASCOINE

Kent Executives

Cleverly heads refinery to go on stream this summer

GENERAL manager of the now-building Kent refinery of Anglo-Iranian Oil Co., Ltd., will be C. S. Cleverly, who has been chief construction engineer at Abadan, resident chief engineer at Haifa, and chief construction engineer for Anglo-Iranian's home and overseas refineries.

Works manager of the Kent refinery is A. W. G. Trantor, former chief engineer at Abadan. D. S. D. Fraser, project manager, has held senior construction engineering posts at Abadan, Haifa, Kuwait, and Llandarcy. Deputy project manager at Kent is L. R. Gascoine, who has spent 14 years in Iran in design, maintenance, and development, and 2 years in the United States working on aviation-gasoline processes.

Despite a strike and a fire at the construction site, Anglo-Iranian still is planning on initial production at the refinery in August.

The refinery, located on the Thames about 40 miles southeast of London, is expected to reach its full throughput of about 84,000 bbl. daily by the end of the year.

FAR EAST

Plans For Plant Enlarged

Standard-Vacuum Oil Co. has revised upward to 25,000 bbl. daily the capacity of the refinery which it is preparing to build on Trombay Island in Bombay Harbor, India.

The company has announced that the new plans, which have been approved by the Indian Government, represent an enlargement of about a third over the original 19,000 bbl. daily project.

Standard-Vacuum said the expansion would permit an important increase in the production of kerosine which is a major petroleum product in India. The new process design provides for an annual production of nearly 48,000,000 United States gallons annually of kerosine compared with the original estimate of 33,500,000 gal. annually.

The refinery may be ready for operations several months earlier than the 1956 date originally anticipated.

International Briefs

Formal inauguration ceremonies for the new 87-mile, 6⅝-in. products pipe line from Porto Salgar to Bogota, Colombia, were held recently at the No. 2 station and at Bogota. The ceremonies were attended by several hundred government officials, businessmen, and oil executives. The new line, financed in part by International Petroleum Co. of Colombia, was built by Williams Brothers Corp., which holds an operating contract for 4 years *(The Oil and Gas Journal, May 12, page 105).*

Texas Petroleum Co. (Colombian Division) has spudded in its latest exploratory venture in Colombia, the Tasajero 1 wildcat located near the Barco concession, Cucuta area, in the eastern part of the country. Preparations for the well have been under way since last fall. Equipment was moved in through Maracaibo in Venezuela. The concession was granted following two decree laws in 1950, which removed the area from the national reserves and thus opened it up to exploration.

Standard Oil Co. of Spain, S.A. (Standard Oil Co. [N. J.]), has inaugurated new bunker-fueling facilities at Las Palmas in the Canary Islands. The $702,000 project includes three 80,000-bbl. tanks, two for bunker-grade residual and one for marine diesel. The facilities replace the company's leased facilities.

B. Restrepo, Colombian businessman and one of three directors of Empresa Colombiana de Petroleos, has been appointed manager of the government company which operates De Mares concession. He succeeds Luis E. Sardi, who recently resigned. Restrepo is head of the Cia. Colombiana de Tabaco at Bogota, one of Colombia's largest industrial concerns.

Big Oil Sale Claimed

Iranian Government says unidentified U.S. firm signs 5-year contract; World Court to begin hearings June 9

THE Iranian Government announced in Teheran last week that it has contracted with a United States company for the sale of 3,000,000 tons of oil annually for 5 years.

The government refused to disclose the name of the company, saying that such information would help Anglo-Iranian Oil Co., Ltd., from whose nationalized properties in southern Iran the oil will be taken. Anglo-Iranian has indicated in the past that it will take legal action against purchasers on grounds that it is the rightful owner of any oil withdrawn.

There was considerable speculation in the industry about the identity of the purchaser. In Washington, State Department officials said they had no knowledge of any deal between Iran and any American company. Assuming the announcement to be correct and the contract definite, some persons in the industry thought the transaction might have been engineered by a United States broker on behalf of a foreign refining organization such as Brazil, Italy, or Argentina.

Deal includes avgas . . . However, the reports from Teheran said that the amount included substantial quantities of aviation gasoline. Whether other products were involved was not known. The 3,000,000 tons a year would amount to an average of about 65,000 bbl. daily—approximately 10 per cent of Iran's former total production. There is around 12,500,000 bbl. of products in storage at Abadan, left by the company when it was forced out of the country.

Over the past 6 months a succession of reports out of Teheran have told of contracts signed or about to be signed for the sale of Iran's oil. However, none of them has materialized, and most officials in the industry believe the main reasons for Iran's lack of success has been the tight tanker market, Anglo-Iranian's threat of legal action against purchasers, and the ability of the industry to meet needs of countries formerly dependent on Abadan.

Although there is no legal barrier against a United States citizen or company buying Iranian oil, provided he can obtain tankers, the State Department inevitably would be concerned in such a transaction since it involves a question of high international policy.

Court hearing soon . . . Meanwhile, the International Court of Justice is preparing to open hearings at The Hague in the Netherlands June 9 on the complaint filed by Britain against Iran.

The Iranian Government, which has already refused to abide by one decision of the court, will be represented personally by Prime Minister Mohammed Mossadegh. Iran claims the court has no authority to the matter, and the court's first step will be to decide this challenge to its jurisdiction.

Last year the court, theoretically the world's highest legal body, asked both sides to the dispute to maintain the status quo and continue operations while the issue was pending. Iran declared the order an invalid interference with its internal affairs and subsequently forced out the British staff of Anglo-Iranian Oil Co., Ltd.

The court is the judicial organ of the United Nations. It has 15 judges elected for 9-year terms by the General Assembly and the Security Council voting independently. No two judges may be nationals of the same state. Great Britain on May 26, 1951, asked the court to make Iran arbitrate the oil issue or declare it guilty of violating international law.

Last week in Teheran, Dr. Mossadegh, despite his repeated insistence the court lacks jurisdiction, declared he hoped it would rule in Iran's favor. "I hope the court will not violate the right of a weak nation because she is weak, and give rights to the strong nations because they are strong."

Iran disillusioned . . . The disillusion resulting from the prolonged stalemate is showing in Iran. An influential Teheran newspaper recently charged that Dr. Mossadegh and his party was mishandling the nationalization and driving the country to economic collapse. The newspaper had formerly been considered pro-Mossadegh.

The prime minister reported to parliament that Iran has offered to sell oil to 36 different nations but has not had a definite reply from any of them. He has blamed Britain for starting an economic blockade and "confiscating goods and materials due us."

The Iranian Oil Commission declined an invitation from Dr. Mossadegh to accompany him to The Hague for the arguments before the International Court. The commission said it was primarily a technical body not concerned with the legal phases of the dispute, but assured the prime minister one or two of its members would accompany him in an advisory capacity.

At Abadan, General Riahi, manager of the refinery, recently denied reports of poor management in the plant and field area. He told the commission

EXTENSION WELL in Saudi Arabia being drilled by Arabian American Oil Co. in a program designed to define the Ain Dar-Uthmaniyah productive area. A short distance from this operation, 73 miles southwest of Abqaiq, Aramco has built its newest desert community. Camp Umm 'Unaiq houses 100 bachelors and nine families.

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PLOUGHING FOR OIL PLANT

On the marshy Isle of Grain in southern England, some 750,000 cubic yards of soil, poor for farming, are being moved in the construction of Britain's latest oil plant. On this site, Anglo-Iranian's fourth refinery in the United Kingdom is rapidly taking shape. By 1953 it will be in full operation with a production capacity of over 80,000 barrels a day; and one more stage will have been completed in Anglo-Iranian's world-wide program of refinery expansion.

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that rumors of wholesale thefts of equipment from the refinery were without foundation. The government appointed a senator, who is a son-in-law of the prime minister, to proceed to Abadan to investigate the reports.

Lebanese Pacts Signed

Agreements increasing the amount of revenue paid to the government have been signed by Lebanon with Iraq Petroleum Co., Ltd., and Trans-Arabian Pipe Line Co.

I.P.C., whose north-branch 12 and 16-in. lines from Kirkuk terminate at Tripoli, agreed to increase revenue to the Lebanese Government from 1,500,000 Lebanese pounds (about $560,000) to 4,500,000 Lebanese pounds (about $1,700,000), according to an announcement in Beirut.

The company was also reported to have agreed to expand the Tripoli refinery so as to meet internal needs of the country. The plant's present capacity is about 10,000 bbl. daily. The higher payments are effective as of May 15, and the agreement is subject to ratification by the Lebanese Parliament.

The new agreement signed by Lebanon with Tapline is reported to increase revenue to the government from this company to about 5,000,000 Lebanese pounds (about $1,870,000) annually. Tapline's 30 and 31-in. line terminates at Sidon.

The two companies are continuing negotiations with Syria on revisions to their transit agreements with this country.

Israeli Line in Bad Shape

The Israeli portion of the 12-in. Kirkuk-Haifa pipe line of Iraq Petroleum Co., Ltd., is reported to have deteriorated considerably and probably could not be brought back into operation without substantial repairs.

The crude line has been idle for the last 4 years due to the Arab-Israeli strife. The Haifa refinery, which it once supplied, is being run on a reduced throughput with crude brought in by tanker. Reports from Israel say that the 12-in. is in particularly bad shape in the stretch between the Jordan River and Mt. Tabor, where the buried line has been uncovered in many places.

There have been no recent developments to indicate that operation of the line can be resumed. Before the shutdown in 1948, I.P.C. laid a parallel 16-in. to the Palestine border, but was never able to complete the project into Haifa.

Refinery to Close

Shell halting operations at 30,000-bbl. Aruba plant

ROYAL DUTCH-SHELL has decided to close down its 30,000-bbl. daily refinery at Oranjestad, Aruba, Netherlands West Indies, at the end of this year, according to reports from Willemstad, Curacao.

The plant was built in 1927 and is operated by N. V. Arend Petroleum Mij. As of the end of last year, crude intake of the plant was slightly above 29,000 bbl. daily.

It was reported that the plant site will be used as a station for ship bunkering and for storage and that the much-larger Royal Dutch-Shell refinery at Curacao will take over processing formerly handled at the Aruba plant.

The Aruba refinery is the smallest of the three which the Royal Dutch-Shell group has in the Caribbean area. Since the end of the war, the company has built a modern new refinery at Cardon in Venezuela and is currently expanding its throughput to 170,000 bbl. daily.

The largest of the Royal Dutch-Shell Caribbean refineries is that of N. V. Curacaosche Petroleum Industrie Mij. (C.P.I.M.) at Curacao. This refinery has a nominal capacity of 200,000 bbl. daily but has been running in excess of 350,000 bbl. daily, including crude charged to the cracking units. The operating company of the Aruba plant is a subsidiary of C.P.I.M.

The Arend refinery is one of the two at Aruba. The other is the much larger plant of Lago Oil & Transport, Ltd. [Standard Oil Co. (N. J.)]. This refinery, now the world's largest operating plant since the Abadan shutdown, has a rated capacity of 425,000 bbl. daily but has had runs in excess of 500,000 bbl. daily.

CIMA Spuds New Wildcat

Mexican American Independent Oil Co. (CIMA) has spudded in a wildcat on the Minatitlan structure in the Isthmus of Tehuantepec region in Vera Cruz, Ralph K. Davies, president of American Independent Oil Co., announced last week in San Francisco.

The location is about 9 miles southwest of Rabon Grande field, discovered by CIMA last year. The Minatitlan location was selected on the basis of seismic work recently completed. Rabon Grande currently is producing upwards of 180,000 bbl. monthly, and the crude is being shipped to the United States.

Support Sought

Esso Colombiana may try second offering of stock

ESSO COLOMBIANA, S. A., Standard Oil Co. (N. J.) marketing affiliate in Colombia, may make another effort later this year to obtain Colombian financial participation in the company.

This would be through a second offering of the company's stock to national investors. The first offering a few months ago failed to attract Colombian capital, and only about 5 per cent of the company's stock was sold. The company was offering up to 40 per cent of its shares to Colombian investors.

Esso Colombiana's offering was an effort to obtain greater national support for the operation.

Why no sale . . . The company's failure to sell any appreciable amount of its stock was attributed partly to local conditions. Company officials in Bogota said other well-established companies with popular stock on the exchange had at the same time made capital increases at attractive prices.

A recent report by Esso Colombiana shows that in 1951, its first year of operations, it had a net profit equivalent to about $2,180,000, with assets equivalent to about $30,460,000. The company was organized late in 1949 and took over the distribution assets of Tropical Oil Co., which included 23 distribution plants, 97 service stations, and a number of Magdalena River tugs and barges.

On reversion of the De Mares concession, the marketing interests of the Jersey Standard organization in Colombia were separated from the refining and producing operations, which were taken over by International Petroleum (Colombia), Ltd. The two Colombian companies are held directly by International Petroleum Co., Ltd., which is controlled by Jersey Standard.

The Esso organization markets nearly all of the gasoline in Colombia. Last year its sales were 158,000,000 gal. of motor and aviation gasoline, and 160,000,000 gal. of asphalt, propane, fuel and diesel oils, lubes, and other products.

New President

Texas attorney is named head of Warren Petroleum

JAMES E. ALLISON, 53, the newly elected president of Warren Petroleum Corp., is a native Texan and a lawyer by profession.

Allison, who took office June 1, has been a vice president, general counsel and a director of the company since June 1946. In 1948 he was elected president of Midland Gasoline Co., Conroe, Tex., a Warren affiliate.

Born in San Saba, he is the son of Judge William Mac Allison. Following graduation from Georgetown High School in 1916 he attended Southwestern University for a year. He received his bachelor of law degree from the University of Texas at Austin.

For several years after his graduation he practiced law at Breckenridge, Tex. At various times he was a member of the law firms of Bowers & Allison, Goggans & Allison, and Harrell & Allison. He began representing The Hanlon companies in the early twenties and resigned from his law partnership in 1937 to become counsel for those corporations in Tulsa.

In 1946 the Hanlon companies were acquired by Warren Petroleum Corp., and Allison became a Warren vice president.

Allison is a member of Mid-Continent Oil & Gas Association, Texas Mid-Continent Oil & Gas Association, American Petroleum Institute, American Bar Association, and various other trade and professional organizations.

C. F. McGoughran has been elected secretary of Sinclair Oil Corp. by the board of directors, succeeding **O. M. Gerstung,** who has retired. McGoughran, who has been a vice president of Sinclair Refining Co. since 1950, will also be director of personnel of the parent corporation and its subsidiaries.

W. K. Warren last week was elected chairman of the board and chief executive officer of Warren Petroleum Corp. Warren had been president of the company since its founding 30 years ago. Succeeding him as president is **James E. Allison. J. A. LaFortune** was elected vice chairman of the board. **D. L. Connelly,** Houston, was elected a vice president and director of the corporation. Connelly is president and a director of Warren Oil Corp., a wholly owned subsidiary, a position he has held since 1948.

Jack H. McCollum is division geologist in the new offices recently opened by Aurora Gasoline Co. at Denver.

Gordon Kerr, who began his career with the Royal Dutch-Shell organization in Mexico and later served 6 years in Venezuela before his transfer to London in 1931, has been appointed secretary of Anglo-Saxon Petroleum Co. The former secretary, **J. R. Colquhoun,** has retired from group service and accepted an appointment as vice president of Canadian Eagle Oil Co., with headquarters in the Bahamas.

GORDON KERR

COLQUHOUN

James R. Hamilton, a graduate geologist from the University of Colorado, is in charge of the new Rocky Mountain office of the La Gloria Corp. at Denver.

O. O. McKenzie, Topeka, Nebraska division manager for Service Pipe Line Co., has been transferred to Shawnee as Oklahoma division manager. He succeeds J. E. Polster, who died April 3. **Harry C. Jones,** who has been acting Oklahoma division manager, has been named Nebraska division manager. **Gus L. Maciula,** Tulsa, a senior engineer, has been transferred to Shawnee and promoted to assistant division manager in charge of southern Oklahoma districts. Maciula has been replaced in Tulsa by **H. T. Chilton, Jr.,** Lubbock, Tex., area engineer in the company's West Texas division.

H. H. Beach has been appointed manager of Texaco Exploration Co. at Calgary. Beach is a graduate of the University of Alberta and holds a Ph.D. degree from Yale University. He was with the Geological Survey, Department of Mines and Resources, Ottawa, before joining Texaco Exploration Co. in 1943 as senior geologist. He was promoted to chief geologist in 1948.

Walter D. Henderson, Wichita, independent operator, has joined M. & L. Oil Corp. there. He will be in charge of the company's land and geological department.

Roscoe A. Cattell, director of the petroleum and natural-gas branch of the Bureau of Mines; **Dale E. Doty,** former assistant secretary of the interior for public-land management and now a member of the Federal Power Commission; and **Arthur H. Redfield,** Bureau of Mines commodity analyst and petroleum authority, have been presented the Interior Department's Distinguished Service Award by Secretary Oscar L. Chapman in recognition of outstanding service.

Gene W. Huff has been promoted and transferred by Humble Oil & Refining Co. from associate petroleum engineer at New Orleans to petroleum engineer at Houston.

P. S. Ervin, independent petroleum engineer, has opened consulting offices in Eastland, Tex. He will specialize in water flooding, secondary recovery and pressure maintenance operations. He formerly was chief petroleum engineer in the minerals division of the Louisiana Department of Conservation.

J. B. Webb, chief geologist and exploration manager for Anglo-Canadian Oil Co., Ltd., was presented with the Alberta Society of Petroleum Geol-

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PERSONALS

ogists' first Medal of Merit at a recent meeting in Calgary. The award is made in recognition of the best published paper submitted to A.S.P.G. during the past year.

Bob Tribble has been transferred from Odessa, Tex., to Houston to become district engineer for Cities Service Oil Co.

A. B. Cox, Jr., has been appointed district geologist for Plymouth Oil Co., and will supervise operations in North Louisiana, Arkansas, and East Texas. He replaces **Paul Fahle, who** resigned to become an independent consulting geologist. **Erwin W. Saye,** geologist for Trowbridge Sample Service in Shreveport, has resigned to become an assistant to Cox.

Bruce Scrafford, widely known Texas petroleum geologist, has joined the Highland Oil Co. of Houston as vice president. He also is assistant general manager of oil and gas operations for Herman and George R. Brown and vice president of Esperado Mining Co. and Frio Pipe Line Co. Since 1943 he had been a consulting geologist in Corpus Christi and San Antonio.

W. S. Moses has been named production manager for Barnett Serio Drilling Co. at Natchez, Miss. He formerly was a petroleum engineer for The California Co. at Cranfield, Miss.

William A. Williams, Montreal, has been selected by Standard-Vacuum Oil Co. to direct its refining activities in India. He will be chairman and managing director of a new subsidiary now being formed to build and operate Stanvac's $35,000,000 refinery at Bombay. Williams has been superintendent of Imperial Oil, Ltd.'s Montreal refinery the past 2 years. He began his career in the laboratory at Imperial's Sarnia, Ont., refinery in 1934.

James J. Bollich has been appointed assistant geologist in the Houston office of Tide Water Associated Oil Co. Following his graduation from the University of Wyoming in 1951, Bollich went to Australia where he did geological research through a Fulbright scholarship.

Guests of Los Angeles Nomads

Guests at the last meeting of the Los Angeles chapter included this group. Left to right, front row, are Al Dysar, Brown Drilling Co., Australia, and A. F. Driskill, formerly with Iraq Petroleum Co. Center row, A. M. Thornton, Shell Oil Co., Colombia; Jorge Maldonado, consul of Venezuela; Guillermo Restrepo, vice consul of Colombia; B. Santo-Coloma, consul general of Colombia; and Arthur Nicholls, Richmond Exploration Co., Venezuela. Back row, Florent H. Bailly, P.I.C., Venezuela; R. L. Jewell, Shell Caribbean Petroleum Co., Venezuela; Harmon Rhodes, Burma Oil Co., India; Phil McConnell, Arabian American Oil Co., Saudi Arabia; Russell E. Havenstrite, Havenstrite Oil Co.; and E. A. Tindall, Arabian American Oil Co., Saudi Arabia.

L. W. Beal, toolpusher for R. L. Manning Co., has been transferred from Riverton to Grass Creek, Wyo.

H. H. Wright has been promoted to area manager in the Tulsa division of Gulf Oil Corp. Wright, who has been with Gulf 25 years, has served as district superintendent at Chase in charge of the company's drilling and producing operations in Kansas the past 6 years.

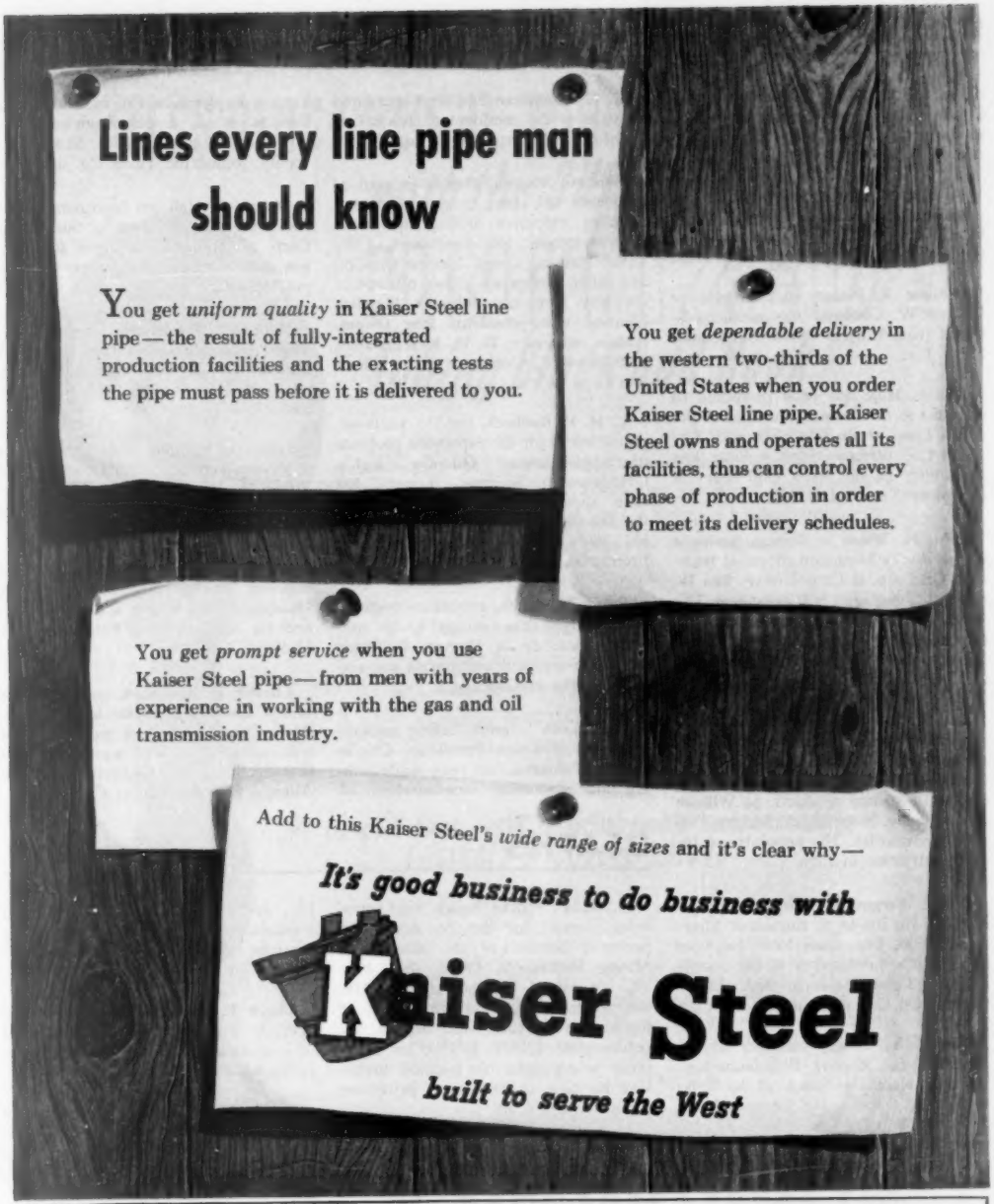
W. Harold Rea, president of Canadian Oil Cos., Ltd., Toronto, has been elected to the board of directors of Interprovincial Pipe Line Co., Ltd.

Edward G. Morin has been transferred from the Esso engineering department of Standard Oil Development Co. in Italy, where he has been on special assignment, to the staff-engineering group of the process-design division. He is succeeded by **Richard C. Wilson. G. W. Gross** has been promoted to assistant supervising engineer in the process-design division and is succeeded as senior project engineer by **D. S. Borey. R. J. Yoder** succeeds Borey as a group head. In the engineering and economics unit **R. O. Wright** has been promoted to assistant supervising engineer, succeeding **J. M. Graham,** who has joined Standard-Vacuum Oil Co. in New York. **D. E. Cook** is the new senior project engineer, replacing Wright. In engineering research **A. K. Scott** now heads a new unit called the applied-theory group, and **R. F. Stearns** is in charge of the field survey group.

Joe P. Watson, formerly district engineer for Cities Service Oil Co., Houston, has resigned to become petroleum engineer for Columbian Carbon Co., Houston.

R. W. Progress has been transferred from the engineering department of Shell Chemical Corp., Martinez, Calif., to the Houston plant. Other Shell Chemical changes include **F. H. Colburn,** transferred from Houston to Martinez as chief engineer; **William Fette,** from Houston to Ventura, Calif., as general foreman; and **V. L. Keldsen,** appointed operations department manager at Ventura.

E. F. H. de Vriendt, Royal Dutch-Shell official who has held several various posts in the Shell organization in South America and who is now in the Bataafsche Petroleum Mij. head office in The Hague, has been appoint-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Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 20" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅛" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	22" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

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PERSONALS

ed secretary-general of the Caribbean Committee, an international body aimed at fostering economic and social progress in the area.

W. E. Gillen has been promoted from petroleum engineer for Texas Pacific Coal & Oil Co. at Breckenridge, Tex., to district engineer at McCamey, Tex.

William R. Bixler, an engineer for George W. Graham, has been transferred from Corpus Christi to Wichita Falls, Tex.

Joe A. Hale has been promoted to assistant to the division manager of the South Texas production division of The Texas Co., effective June 1. Since last September he has been land man on the general manager's staff.

John H. Wiese is division geologist of the Rocky Mountain office of Richfield Oil Corp. in Casper, Wyo. **Ben W. Ryan, Jr.,** geologist, will assist him. The Casper office will supervise exploratory work in Montana, Wyoming, North Dakota, South Dakota, Utah, Colorado, and Nebraska.

Dr. R. B. Killingsworth has been appointed manager of the technical department of Vacuum Oil Co., Ltd., London. He now is staff assistant, in charge of special products, to **William M. Holaday,** director of Socony-Vacuum laboratories. The appointment becomes effective in July.

J. W. Ferguson, senior natural-gas engineer for the U. S. Bureau of Mines at Amarillo, Tex., since 1946, has been appointed senior analyst in the coordinating and planning department of Continental Oil Co. at Houston.

Daniel A. Busch, manager of exploration for Zephyr Petroleum Co., has been elected president of the Tulsa Geological Society. He succeeds **V. L. Frost** of Ohio Oil Co. Other new officers are: **Myron C. Kiess,** Mid-Continent Petroleum Corp., first vice president; **Rex Benway,** Schlumberger Well Surveying Corp., second vice president; and **Charles Lane,** Deep Rock Oil Corp., secretary-treasurer. **Mrs. H. V. P. Branson,** Shell Oil Co., was elected editor of The Digest, annual publication, and **Robert E. Megill,** Carter Oil Co., business manager. New members of the council are: **Charles Agey,** Amerada Petroleum Corp.; **Paul Reisher,** Gulf Oil Corp.; **Charles Jones,** Stanolind Oil & Gas Co., and Frost.

H. G. Horstman has been appointed assistant to the president of Texas Gas Transmission Corp., New York.

Winfield Morten, Dallas, is head of Overland Oil, Inc., a new company planning extensive drilling operations west of Denver. He is president of the Texas Housing Corp., Morten Oil Co., and other enterprises. Other officers of the new firm are: **John O. Hayden,** Denver, vice president; **Roe Owens,** Austin, secretary; **R. D. Keys,** Dallas, and **James R. Cochran,** Dallas, directors.

C. H. E. Rebbeck, for 3½ years superintendent for the expansion program of Anglo-Iranian Oil Co., Ltd.'s, Grangemouth, Scotland, refinery, has been appointed resident engineer for the company's projected new 60,000-bbl. daily refinery at Kwinana, near Fremantle, Western Australia.

Frank N. Bosco, petroleum engineer and geologist, has returned to his consulting practice in Denver, following U. S. Government assignment for several months in Greenland.

S. P. Kent, formerly acting assistant manager of Texas Petroleum Co. in Bogota, Colombia, has been made drilling and production superintendent of Texaco Exploration Co. in Edmonton, Canada. Kent, a petroleum-engineering graduate of Louisiana State University, joined the Texas Co. in 1934.

Donald E. Hall has been named district production engineer for Sunray Oil Corp. at Midland, Tex. He formerly was senior engineer for Sunray at Corpus Christi.

William J. Sanderson, subsurface geologist formerly with International Petroleum Co. at Bogota, Columbia, is now with Imperial Oil, Ltd., at Regina, Sask.

Ivian A. Parmer, formerly division superintendent for Coronado Oil Co., Tulsa, has been appointed manager of operations for **H. A. Horwitz,** Abilene, Tex.

A. T. Sindel, Jr., formerly district engineer for Bay Petroleum Corp., at Oklahoma City, is now a division engineer for Ashland Oil & Refining Co. at Midland, Tex.

Chester P. Abrassart, geologist, has joined **Emmett E. Schieck** and **E. J. Boos,** Casper consulting geologists, and will specialize in well work and field investigations. He formerly was with Atlantic Refining Co. at Casper.

DEATHS

N. A. C. (Nick) Smith, 66, petroleum chemist for the Petroleum Experiment Station of the Bureau of Mines, Bartlesville, Okla., died May 19. He joined the bureau in 1918, was made assistant superintendent of the station in 1925, and became superintendent in 1926. In 1945 he voluntarily relinquished his position to devote his time to writing on petroleum chemistry and crude oils.

James William Meazel, Shawnee, Okla, widely known oil lease broker, died in a Bismarck, N. D., hospital May 22 of injuries suffered in an automobile accident. He had been active in the Mid-Continent area since 1920.

Lafe Lewis Woodruff, 61, Tulsa, veteran pumper at the West Tulsa refinery of Mid-Continent Petroleum Corp., died recently.

Thomas W. Simmons, 66, president of Simmons Oil Co., Johnston Pump Co., and Johnston International, and a director of Simaroo Oil Co. and the Western Oil and Gas Association, died recently in Los Angeles.

Floyd E. Johnson, independent oil operator with offices in Houston, died of a heart attack in Victoria, Tex., recently.

J. Charles O'Brien, an executive of O'Brien Brothers, Inc., Shreveport, and who formerly was associated with Sinclair Oil Corp., died recently at Shreveport.

F. N. (Tug) Irving, widely known Oklahoma City oil operator, and president of Irving Drilling Co., died May 28 at Oklahoma City.

Roy B. McKee, 73, former vice president of Freedom-Valvoline Oil Co., died May 25 at Beaver, Pa. He retired in April after 34 years with the company.

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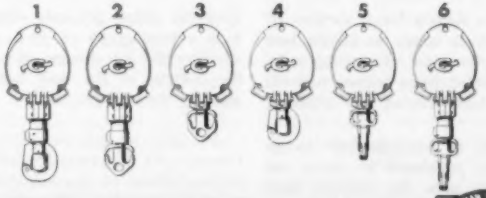

1 Block and Spring Hook Assembly
2 Block and Spring Duplex Hook Assembly
3 Block and Short Duplex Hook Assembly
4 Block and Short Hook Assembly
5 Block and Short Triplex Hook Assembly
6 Block and Spring Triplex Hook Assembly

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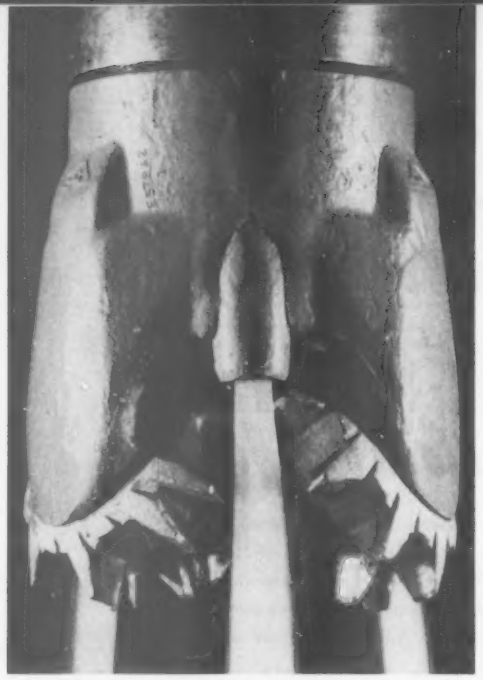


JET BIT showing jet streams directed to bottom of hole and missing the cutters (Fig. 1).

HOLE SIZE	-9 $\frac{7}{8}$"
DRILL PIPE	-4 $\frac{1}{2}$", 6"x3" FH
DRILL COLLARS	-270 FT, 6 $\frac{1}{4}$" x 2 $\frac{7}{8}$"
STAND PIPE	-4" ID x 45 FT
HOSE	-3" ID x 55 FT
KELLY	-3 $\frac{1}{4}$" ID x 40 FT
SWIVEL	-2 $\frac{1}{2}$" ID x 5 FT
PUMP	-14" DUPLEX, POWER
MUD WEIGHT	-9 $\frac{1}{2}$ LBS. PER GAL

PUMP DATA
OPERATED AT 60 STROKES PER MIN.
90% VOLUMETRIC EFFICIENCY ASSUMED

LINER SIZE	GPM
7 $\frac{1}{2}$	557
7 $\frac{1}{4}$	519
7	483
6 $\frac{3}{4}$	447
6 $\frac{1}{2}$	413
6 $\frac{1}{4}$	380
6	349
5 $\frac{3}{4}$	319
5 $\frac{1}{2}$	290

Fig. 2—Pump data for various circulation rates.

How to use

Jet-Nozzled Rock Bits

. . . to get best performance and efficiency

by L. L. Payne* and R. H. Nolley†

IT has been known for a number of years that, in order to obtain best rock bit performance, (1) cutting must be rapidly lifted from bottom and (2) the cutters kept free of any adhering material.

Rock bits of conventional design have nozzles positioned to direct the drilling fluid onto the cutters, thus using the main force of the jet streams to keep the cutters clean while a portion of the energy reaches bottom with capacity sufficient to sweep loose cuttings into the upward moving annulus stream.

The so-called "jet bit" has nozzles positioned to direct the drilling fluid directly onto bottom. With this arrangement the turbulence created around the bit must be relied upon to keep the cutters properly cleaned. Fig. 1 is a photograph of such a jet bit, showing the jet streams directed onto the bottom of the hole and entirely missing the cutters.

*Chief engineer and †staff engineer, Hughes Tool Co. Paper presented at technical session of twenty-second annual meeting, North Texas Oil and Gas Association, Wichita Falls, Tex.

Attempts to improve rock-bit performance by directing the drilling fluid to the bottom of the hole were made as early as 1921. Sporadic attempts were made in the following years until 1947, but none of the tests proved satisfactory. Viewed in the light of present knowledge, it appears that failure was principally due to inadequate velocity of the jet streams.

In 1947 a major oil company determined that drag-bit performance could be improved by increasing the velocity of the drilling fluid jetting through nozzles directed at bottom and slightly ahead of the blades. It was also determined that the most efficient use of available hydraulic power resulted in the selection of relatively small-diameter nozzles, establishing jet velocities considerably greater than those commonly used. Early in 1948 this same company initiated field testing of rock bits equipped with bottom jetting nozzles. These initial tests were made employing jet velocities three to four times those ordinarily used in conventional bit operation. The results were sufficiently encouraging to warrant further work which has led to considerable testing in widely scattered areas.

Jet Rock-Bit Operations

A large percentage of those operators having suitable hydraulic equipment in the East Texas, northern Louisiana, and Gulf Coast areas have adopted the practice of jet rock-bit operation. The increase in rock-bit performance, as later discussed, in regard to penetration rate and footage per bit has varied very widely.

Experience with jet rock bits in the past 4 years has not supplied the answers to all questions regarding methods of operation under all conditions. However, experience gained in areas where results have been favorable may be used as a guide for those in other areas who wish to try jet bits as a means of increasing bit performance. As always, comparisons based on cost must be used for final evaluation. The premium price of jet bits and a possible increase in the cost of operating hydraulic equipment must be charged against any savings resulting from improved bit performance.

Velocities . . . In the case of conventional bit operation, nozzle sizes and circulation rates which result in a jet velocity of approximately 100 ft. per second are generally used. Any appreciable increase of jet velocity above this value would, in many cases, cause severe erosion on the shell and teeth of rock-bit cutters.

In the case of jet bits, it has been

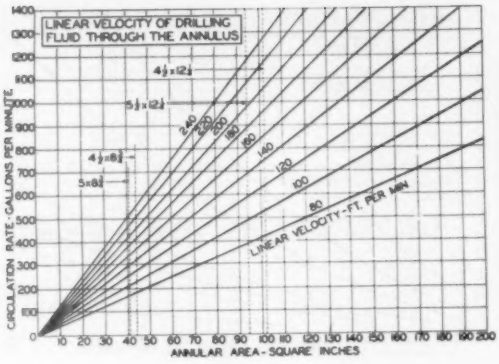

LINEAR VELOCITY OF DRILLING FLUID THROUGH THE ANNULUS
CIRCULATION RATE - GALLONS PER MINUTE
ANNULAR AREA - SQUARE INCHES
LINEAR VELOCITY - FT. PER MIN

Fig. 3.

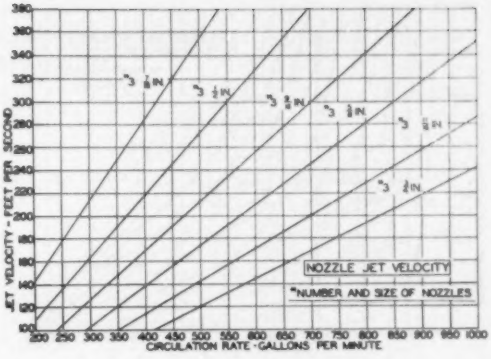


Fig. 4.

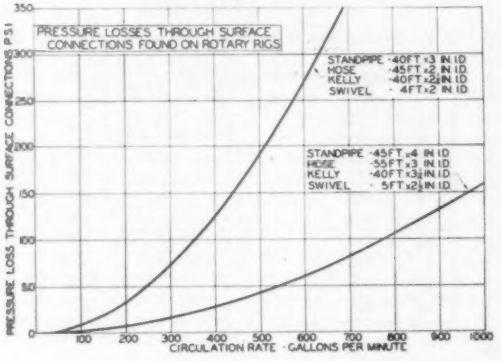

PRESSURE LOSSES THROUGH SURFACE CONNECTIONS FOUND ON ROTARY RIGS
PRESSURE LOSS THROUGH SURFACE CONNECTIONS P.S.I.
CIRCULATION RATE - GALLONS PER MINUTE

Fig. 5.

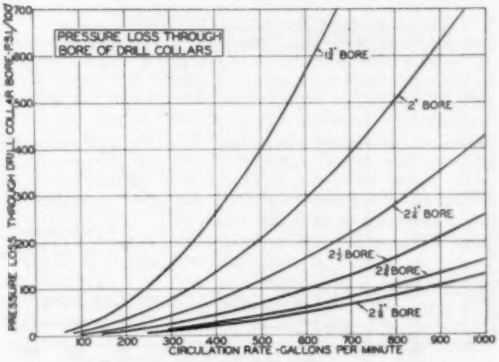

PRESSURE LOSS THROUGH BORE OF DRILL COLLARS
PRESSURE LOSS THROUGH DRILL COLLAR BORE P.S.I./100'
CIRCULATION RATE - GALLONS PER MINUTE

Fig. 6.

found that jet velocity, compared to that used on conventional bits, must be increased so that cuttings will be quickly lifted from bottom and sufficient turbulence created around the bit cutters to keep them properly cleaned. In those areas where a consistent appreciable increase in bit performance has been realized by using hole-bottom jets, it has been found necessary to establish a minimum jet velocity of approximately 200 ft. per second for the hole sizes in the 7⅞ in. to 9⅞ in. range. The satisfactory minimum for all formations and bit sizes is not known. At present, it appears that the satisfactory minimum jet velocity has a definite relationship to rate of penetration. Weight applied to the bit, speed of rotation, strength of formation, and bit type are still important factors affecting penetration rate and over-all bit performance notwithstanding the use of jets.

In those areas where jet-bit drilling is at present fairly widespread, circulation rates considered adequate for conventional drilling are also commonly used for jet operation. Circulation rates which produce a theoretical velocity up the annulus of approximately 180 ft. per minute are considered adequate for most conditions.

When jet bits are operated as indicated by the values for jet velocity and circulation rate, as stated above, it may be seen that for any given depth of hole, as far as the hydraulic equipment of the rig is concerned, the only new factors introduced are an increase in pump discharge pressure and a corresponding increase in horsepower input to the pump. Experience has shown that it is advisable, especially in the case of power pumps, to anticipate the depth of hole at which pumps or engines may be loaded to rated capacities in order to avoid the hazards of insufficient circulation or overloading of pumps and engines.

How To Calculate

By the use of available hydraulic formulas[1], it is possible to determine with satisfactory accuracy the depth to which the hydraulic equipment of a particular rig may safely be used in the operation of jet bits. To illustrate how this may be done, we may consider, for example, the drilling of an 8¾-in. hole with certain equipment and conditions as listed in Fig. 2. It will be noted that the rated discharge pressure of the pump for the various liner sizes is not shown in this figure. The use of two different 14-in. pumps (Fig. 10) having rather wide differences in maximum recommended discharge pressures will be considered. This is being done to emphasize that pump manufacturers' recommendations on discharge pressures should be considered, in addition to stroke length and liner size.

1. Circulation Rate . . . The first consideration in this type of problem is to determine the circulation rate which will produce the desired velocity of the mud up the annulus, and thus allow the selection of liners for the pump. Referring to Fig. 3, it will be noted that in order to establish an annular velocity of 180 ft. per minute, using pipe and hole size shown in Fig. 2, a circulation rate of approximately 410 g.p.m. will be required. Since the use of 6½-in. pump liners (Fig. 2) will produce approximately 413 g.p.m., the selection of that size is assumed.

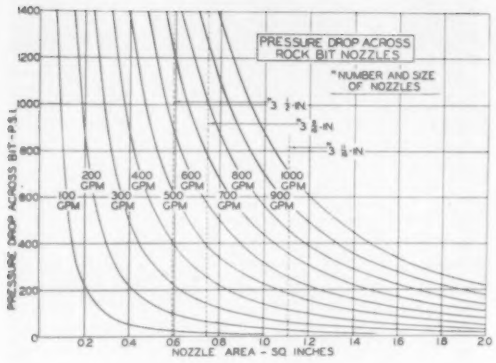


Fig. 7.

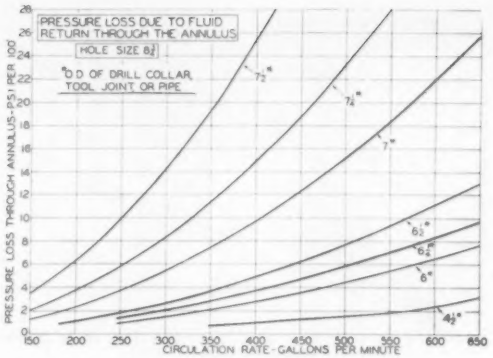


Fig. 8.

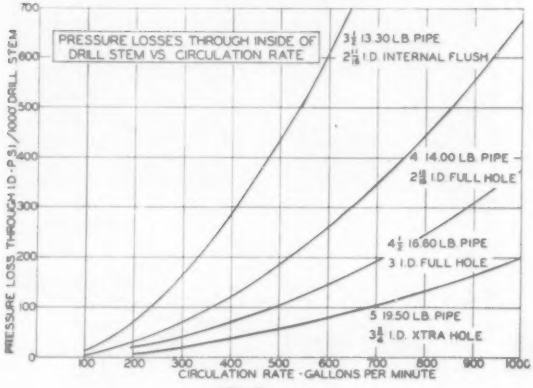

PRESSURE LOSSES THROUGH INSIDE OF DRILL STEM VS. CIRCULATION RATE
3 1/2 13.30 LB. PIPE
2 25/64 I.D. INTERNAL FLUSH
4 14.00 LB. PIPE
2 13/16 I.D. FULL HOLE
4 1/2 16.60 LB. PIPE
3 I.D. FULL HOLE
5 19.50 LB. PIPE
3 1/4 I.D. XTRA HOLE
PRESSURE LOSS THROUGH I.D. - P.S.I. / 1000' DRILL STEM
CIRCULATION RATE - GALLONS PER MINUTE

Fig. 9.

14" DUPLEX POWER PUMPS
OPERATED AT MAXIMUM RECOMMENDED SPEED OF 60 STROKES PER MINUTE, 90% VOLUMETRIC EFFICIENCY ASSUMED

LINER SIZE	GALLONS PER MINUTE	MAXIMUM RECOMMENDED DISCHARGE PRESSURE POUNDS PER SQUARE INCH	
		PUMP A	PUMP B
7 1/2	557	529	828
7 1/4	519	568	900
7	483	610	970
6 3/4	447	659	1,047
6 1/2	413	714	1,135
6 1/4	380	775	1,233
6	349	845	1,346
5 3/4	319	924	1,476
5 1/2	290	1,016	1,627

Fig. 10.

2. Nozzle size . . . Next, the size of nozzles which will produce the desired jet velocity must be determined. Fig. 4 can be used for this purpose. With a circulation rate of 410 g.p.m., it is found that three ½-in. nozzles will produce a jet velocity of approximately 225 ft. per second, which is slightly above the arbitrary satisfactory minimum of 200 ft. per second.

3. Pressure losses . . . After a definite circulation rate and nozzle size have been selected, the pressure losses in the various parts of the hydraulic system may be determined. Those pressure losses which are independent of hole depth are considered first, and these are:

a. Pressure loss from pump to the lower end of the kelly.

b. Loss through bore of drill collars.

c. Pressure drop across the bit nozzles.

d. Losses up the annulus between hole and drill collars.

The pressure losses as shown by the curves in Figs. 5, 6, 7, 8, and 9 are based on the use of mud weighing 9½ lb. per gallon, as assumed in the example being considered. If mud weighing other than 9½ lb. per gallon is used, then values for pressure losses obtained from these curves may be properly adjusted by multiplying by the ratio of actual mud weight to 9½. Experience has shown that the curves may be used for considering a rather wide range of conditions. When oil-emulsion muds are used, actual pressure losses may be somewhat less than those indicated by the curves.

a. Pressure loss from the pump to lower end of the kelly is depicted in Fig. 5. It can be seen that at a circulation rate of 410 g.p.m., using the piping combination shown in Fig. 2, a pressure loss of approximately 30 psi. will occur. The pressure loss from the pump to the standpipe is not included. This will depend on the piping of the particular rig, but it is ordinarily a rather low value for most systems.

b. Pressure loss through the bore of drill collars is given in Fig. 6. For drill collars with 2¾-in. bore, the pressure loss will be approximately 30 psi. per 100 ft. at 410 g.p.m. Since there are 270 ft. of drill collars, the total pressure loss will be 81 psi.

c. Pressure drop across bit nozzles is obtained from Fig. 7. Using a volume of 410 g.p.m., the drop across the nozzles will be approximately 420 psi. when the bit is equipped with three ½-in. nozzles.

d. Pressure loss up the annulus at the drill collars is covered by Fig. 8. At a flow of 410 g.p.m., the pressure loss for each 100 ft. of 6¼-in. o.d. collars will be slightly under 4 psi. This will amount to only about 10 psi. for the 270 ft. of collars.

Adding drill stem . . . Having determined the pressure losses which are independent of depth of hole, the losses which will occur as a result of adding drill stem to the system should next be determined. Fig. 9 may be used for determining part of such losses. At a flow of 410 g.p.m., a pressure loss of approximately 65 psi. will occur through each 1,000 ft. of drill stem. It may be determined from Fig. 8 that the pressure loss up the annulus between each 1,000 ft. of drill stem and the hole will

PRESSURE LOSS LOCATION	PRESSURE LOSS P.S.I.
PUMP TO KELLY	30
DRILL COLLAR BORE	81
BIT NOZZLES	420
DRILL COLLAR ANNULUS	10
TOTAL	541

PRESSURE LOSS PER 1000 FT OF DRILL STEM = 78 P.S.I.

PUMP "A"	PUMP "B"
MAX. REC'MD DISCH PRESS - 714 PSI TOTAL INDEPENDENT LOSSES - 541 PSI DIFFERENCE 173 PSI	MAX. REC'MD DISCH PRESS - 1135 PSI TOTAL INDEPENDENT LOSSES - 541 PSI DIFFERENCE 594 PSI
DEPTH AT WHICH PUMP WILL BE LOADED TO RATED CAPACITY	DEPTH AT WHICH PUMP WILL BE LOADED TO RATED CAPACITY
$\frac{173}{78} \times 1000 \div 270$	$\frac{594}{78} \times 1000 \div 270$
2,280 ÷ 270	7820 ÷ 270
2,550 FT.	8090 FT.

Fig. 11.

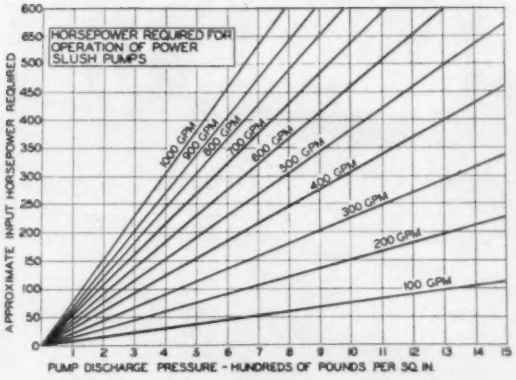


Fig. 12.

be approximately 11 psi. Thus the pressure loss incurred by the addition of each 1,000 ft. of drill stem to the system will be 65 plus 11, or 76 psi.

Pump Capacities

In Fig. 10 it will be noted that with 6½-in. liners the maximum recommended discharge pressure for pump A is 714 psi. and for pump B it is 1,135 psi. These values are used in Fig. 11 in determining the depth of hole at which each pump will be loaded to rated capacity under the conditions of the example. It may be seen in Fig. 11 that the pressure losses which are independent of hole depth total 541 psi. This value is subtracted from the maximum recommended discharge pressure of each pump. The difference in each case represents pump capacity available for the pressure increase which will be caused by adding drill stem to the system.

Since the additon of each 1,000 ft. of drill stem will cause a pressure increase of 76 psi., the amount which can be added may be determined by dividing 76 into the difference noted and multiplying by 1,000. Adding the length of drill collars, it is seen that pump A will be pumping against its maximum recommended discharge pressure at a depth of 2,550 ft. and likewise pump B at a depth of 8,090 ft.

Horsepower Requirements

After the hydraulic possibilities of the pumps have been determined, it is advisable to determine also the horsepower requirements. The hydraulic calculations will be merely academic unless sufficient engine power is available. The horsepower values shown in Fig. 12 are based on an over-all efficiency of 76 per cent.

In Fig. 12 it can be seen that pump B, which can be used to a depth of 8,090 ft. under the conditions in the example, would require approximately 350 horsepower when that depth is reached. Pump A would require approximately 225 hp. when the depth of 2,550 ft. is reached. When comparing engine horsepower with pump requirements, consideration should be given to the engine manufacturers' rating for continuous service at the particular r.p.m. of operation.

It should be noted that if a pump is operated at less than maximum speed, then hydraulic output based on the maximum cannot be realized without exceeding the maximum recommended discharge pressures. It is advisable to consult the pump manufacturer regarding operating practices which may result in exceeding the maximum recommended discharge pressures.

Comparison of Operating Conditions

In the drilling of some formations, which have fairly high compressive strength and consequently lower drillability compared to the low strength formations, it has been found that circulation rates which result in an annular return velocity somewhat less than 180 ft. per minute may be safely used. To illustrate the results of reducing circulation rates, we may consider the example previously discussed and assume the use of 6¼-in. pump liners. Pump delivery will be approximately 380 g.p.m. This rate will result in an annular velocity of 165 ft. per minute and a jet velocity of 207 ft. per second. Assuming the use of pump A, it may be determined that the discharge pressure will reach the recommended maximum of 775 psi. for 6¼-in. liners at a depth of approximately 4,870 ft. This increase in the depth to which pump A can work without overloading is due to the higher allowable discharge pressure with the smaller liners and the decreased pressure losses in all parts of the system at the lower circulation rate.

It is interesting to note the results of substituting 5-in. drill pipe with Xtra Hole tool joints for the 4½-in. pipe with Full Hole joints in the same example. A circulation rate of 380 g.p.m. through the annulus of 5-in. pipe and 8¾-in. hole will produce a velocity of 180 ft. per minute. Again assuming the use of pump A, it may be determined that the maximum recommended discharge pressure will be reached at a depth of approximately 7,600 ft. This illustrates the hydraulic advantage of the larger pipe.

By way of contrast, it is interesting to note the results of using smaller drill pipe. Assuming the use of 3½-in. pipe with I.F. joints, pump A will be fully loaded at a depth of only 1,460 ft. This is also based on a circulation rate of 380 g.p.m. which produces a velocity of 147 ft. per minute in the annulus between the 3½-in. pipe and 8¾-in. hole.

Some operators having suitable

(*Continued on page 84*)

JET PERFORMANCE VS. CONVENTIONAL BITS

Location of well—	Section drilled (ft.)	Size hole (in.)	Indicted per cent improvement compared to conventional bits: Average rate of penetration	Indicted per cent improvement compared to conventional bits: Average feet per bit
Panola County, East Texas	4,400	9	18	42
Harrison County, East Texas	6,700	8¾	49	46
Ector County, West Texas	3,900	8¾	—5	90
Titus County, East Texas	4,400	8¾	21	22

Electrolytic caustic regenerator and disengaging drum, A.D.C. process.

Electrolytic regeneration of treating solutions provides

Low-Cost Removal of Sulfur Compounds From Motor Fuels

by Oliver J. Zandona* and Charles W. Rippie†

CAUSTIC treating has long been utilized by refiners to obtain partial or complete sulfur removal from gasoline, depending on feed-stock characteristics and required product specifications. The process which incorporates steam regeneration of spent caustic has been hampered by limitations in the strength of caustic which can be employed, the degree of caustic regeneration, and corrosion.

A new electrolytic caustic regeneration process, termed the A.D.C. process, offers important improvements in the efficiency and economy of caustic treating. Extensive laboratory investigations of this new technique were originally conducted by American Development Corp., the process owners. Findings indicated that the new approach to the problem has definite commercial possibilities.

Confirmatory pilot-plant studies were undertaken last year in cooperation with Ashland Oil & Refining Co. A small 300-bbl. per day experimental unit was assembled and operated at the refinery. On the basis of the successful findings from that unit, a plant-scale unit was constructed at the Ashland refinery for the electrolytic regeneration of caustic capable of processing 8,500 bbl. of gasoline daily. This first commercial application of the A.D.C. process incorporated design improvements arising from the pilot-plant studies conducted. Fig. 1 is a flow sheet of the electrolytic regeneration unit.

Equipment and Flow

The function of the mercaptan-extraction unit is to remove detrimental sulfur-bearing materials from plant gasolines. The removal of the mercaptans improves odor, color, storage stability, response to lead for octane improvement, and inhibitor for stability.

The gasoline-treating operations consist of:

1. Prewashing with caustic-soda solution to remove hydrogen sulfide (H_2S): Caustics used in prewashing are converted to sodium-acid sulfide, and must be disposed of as foul caustic solutions.

2. Caustic-soda extraction of mercaptans from the hydrogen sulfide - free gasoline in countercurrent packed towers: Caustic used in mercaptan absorption is continuously regenerated and returned to the extracting columns.

Sour, straightrun gasoline enters a two-stage mixer-settler prewash system, where hydrogen sulfide is removed. The

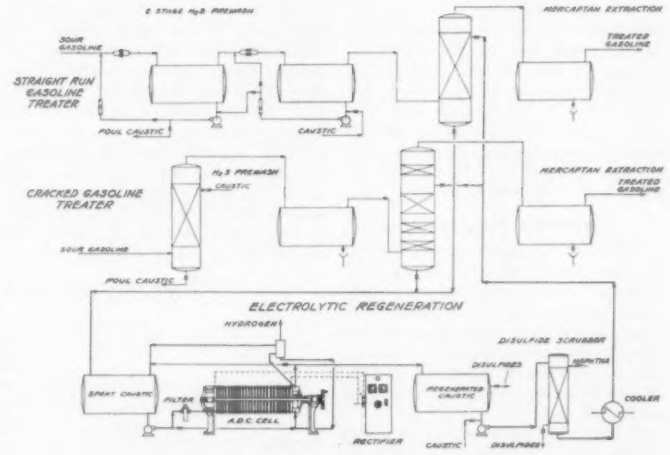
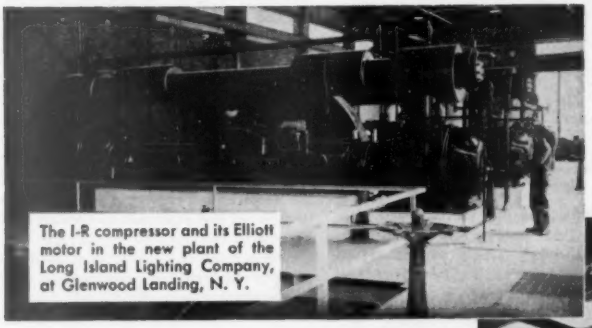


Fig. 1—Flow scheme of electrolytic caustic-regeneration unit.

*Chemical engineer, Ashland Oil & Refining Co., Ashland, Ky., and †Vice president, American Development Corp., New York. Presented at midyear meeting of the A.P.I. Refining Division, San Francisco, May 14.

LARGE ELLIOTT MOTOR
...drives gas compressor
for maximum capacity

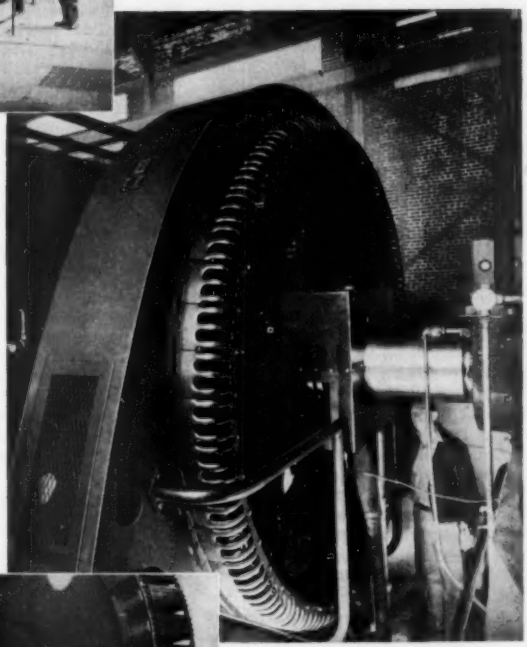


The I-R compressor and its Elliott motor in the new plant of the Long Island Lighting Company, at Glenwood Landing, N. Y.

At the new Glenwood Landing (N. Y.) plant of the Long Island Lighting Company an Elliott 2000-hp engine-type synchronous motor drives an Ingersoll-Rand type PRE-2-4C compressor to serve the rapidly expanding needs of Long Island's home developments.

With the flexibility of Elliott "Fabri-Steel" construction, the motor is designed specifically for its job. The rotor is split to permit mounting on the compressor crankshaft, and engineered with sufficient flywheel effect to prevent the reciprocating motion of the compressor from causing objectionable pulsations in the electrical system. Enclosed collector rings eliminate fire hazard.

The many superior construction details of Elliott low-speed synchronous motors are fully covered in Bulletin 5000-2. Address Dept. OG.



Close-up of the motor, showing explosion-proof, ventilated collector ring enclosure, with lucite windows for visual inspection.

The rotor is of full-split construction, with edge-wound copper strap field coils. Starting winding bars are silver-brazed to the end ring segments for low resistance and for permanent tightness.

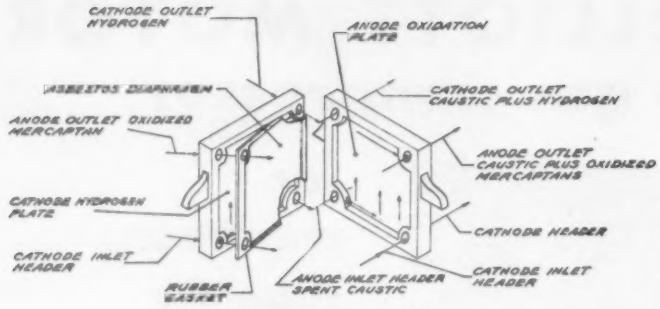


Fig. 2—Diagram of electrolyzer plate assembly.

two-stage system affords greater utilization of caustics previous to their disposal. First-stage caustic circulation usually proceeds until 95 per cent has been spent as sodium-acid sulfide. (NaHS) where previously 70 per cent spent was considered as maximum.

Gasoline which leaves the prewash system is charged into the straightrun gasoline absorber, 4 by 27 ft., packed with 15 ft. of 1½-in. carbon raschig rings. Caustic at the rate of 20 per cent by volume of the gasoline is used in the countercurrent scrubbing of the sour gasoline stream. Treated gasoline passes from the absorber through a knockout drum, and thence to treated rundown storage.

Sour cracked gasoline is charged to a prewash column, 5 by 19 ft., packed with 12 ft. of 1½-in. carbon raschig rings. The operation is a batch caustic treatment, in which foul caustic is removed when spent to 90 per cent as sodium acid sulfide (NaHS). Cracked gasoline passes from the prewash tower to a knockout drum before it is charged into the extracting column, 5 ft. 6 in. by 54 ft., packed with 18 ft. of 1-in. carbon raschig rings.

Caustic at the rate of 20 per cent by volume of the gasoline is used in the countercurrent scrubbing of the sour-gasoline stream. Treated gasoline passes from the absorber through a knockout drum, and thence to treated rundown storage. Gum inhibitor is injected into the treated cracked-gasoline stream.

Caustic regenerator. — The A. D. C. electrolyzer consists of 60 electric cells in series, through which the spent caustic-soda solution is regenerated by an applied direct electric current. Electrodes are nickel-plated cast iron, 24 or 36 in. square by 1 in. thick, separated by rubber-gasketed vulcanized-asbestos diaphragms. Fig. 2 is a diagram of the electrolyzer plate assembly. The two plates have a 3/16-in. recess to accommodate the flow of caustic.

A unit consists of an anode oxidation plate and a cathode hydrogen plate, separated by an asbestos diaphragm. Four holes in the plates form headers through which caustic flows. Spent caustic enters the lower port, and flows upward and diagonally to the top port before it enters the anode outlet header. A similar set of ports is provided for the cathode hydrogen plates which permit circulation of spent caustic-soda solution and the release of hydrogen gas. When the 60 electrolyzer plates separated by diaphragms are sealed together, the holes form 4 channels the entire length of the cell.

The electrolyzer capacity is dependent upon mercaptan-oxidation requirements and flow rates. The 24-in. and 36-in. cells are capable of utilizing 45 and 90 kw., respectively; and flow rates of 1,700 and 3,400 bbl. per day are considered nominal. With the foregoing considerations, the necessary size of equipment can be determined.

Spent caustic from the absorbers is charged into the spent-caustic storage tank. Spent caustic is pumped through a filter and into the anode plates of the regenerator. A slip stream is charged into the cathode plates to sweep the plate of hydrogen gas and decrease over-voltage. Nascent oxygen, generated at the surface of the anode, oxidizes the sodium mercaptides to disulfides, which are carried out of the cell to the regenerated caustic tank. The nascent oxygen is developed in the cell by electrolysis of part of the water present in the caustic solution.

Hydrogen is inert to reaction at the cell conditions, and is carried out in caustic solution to an elevated disengaging drum, where it is vented. Caustic is returned to the cathode inlet header. An overflow stream from the disengaging drum is directed to the spent-caustic tank. Direct current is supplied to the electolyzer by means of a selenium rectifier. The rectifier design is such that it provides a source of direct current, with a means of varying the voltage and the amperage. The selenium-type rectifier lends itself well to this purpose, and is competitive in costs with motor-generator equipment.

Disulfides are separated from the regenerated caustics by settling, and are periodically removed. Final traces of disulfides are removed by passing the caustic through naphtha in a disulfide scrubber, 3 ft. 6 in. by 20 ft. 6 in., packed with 15 ft. of 1-in. carbon raschig rings. Naphtha is changed periodically when saturated with disulfides. The regenerated caustic leaving the disulfide scrubber is returned to the mercaptan absorbers.

Process Reactions

The basic reaction for the success of the electrolytic regeneration of caustic consists of the oxidation of sodium mercaptide to the disulfide by nascent oxygen generated by the passage of direct current through the plates of an electrolyzer.

Reaction:

1. $H_2O \rightarrow O + H_2(g)$
2. $2NaSR + O \rightarrow R_2S_2 + Na_2O$
3. $Na_2O + H_2O \rightarrow 2NaOH$

Over-all reaction:

$2NaSR + 2H_2O \rightarrow R_2S_2 + 2NaOH + H_2(g)$

Steam regeneration of secondary NaSR:

1. $NaSC_3H_7 + H_2O \xrightarrow{\text{Heat}} C_3H_7SH + NaOH$
2. $C_3H_7SH \rightarrow C_3H_6 + H_2S$
3. $H_2S + 2NaOH \rightarrow Na_2S + 2H_2O$

Over-all reaction:

$NaSC_3H_7 + NaOH \rightarrow Na_2S + C_3H_6 + H_2O$

The foregoing reaction yields the key to the formation of the troublesome corrosive sodium sulfide (Na_2S) in the steam regeneration of caustics used for the treatment of thermal or catalytic cracked gasolines.

Caustic Regeneration

The amount of mercaptan-sulfur compounds oxidized in a sodium hydroxide solution depends upon the following conditions:

1. Rate of flow of spent sodium hydroxide solution.
2. Concentration of sodium hydroxide solution.

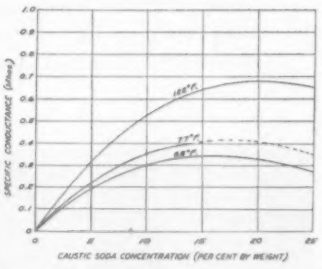


Fig. 3—Specific conductance of caustic-soda solutions.

3. Concentration of mercaptan sulfur in spent sodium hydroxide solution.

4. Temperature of sodium hydroxide solution.

5. Amperage applied per square foot of cell area.

6. Voltage applied per cell in the electrolizer.

Electrical conductivity of the solution depends on concentration and temperature of the caustic-soda solution, as shown in Fig. 3. This curve shows that 15 per cent sodium hydroxide has 0.35 and 0.65 specific conductance at 65° and 122° F., respectively; whereas a 10 per cent solution has 0.30 and 0.56 specific conductance at the foregoing temperatures. The higher specific conductance values mean lower resistance and voltage of the solution and, hence, higher amperage. Higher temperatures increase the specific conductance of the sodium hydroxide solution.

Fig. 4 is presented to indicate the relationship of solution activity, expressed in pounds of sulfur reduction per kilowatt-hour over a limited range of temperature. An increase of temperature results in an increased rate of oxidation.

The relationship of solution activity plotted against percentage of sodium-mercaptide concentration in spent caustic solution is shown in Fig. 5. Repeated tests have shown increased solution activity at higher sodium-mercaptide concentrations.

Theoretical sulfur reduction may be determined from electrochemical equivalents. The change of valence for mercaptan sulfur to the disulfide sulfur is one; consequently, it is possible to determine the theoretical sulfur oxidized. A plot of the theoretical sulfur reduction vs. the voltage per cell is indicated in Fig. 6. Thus, for a cell voltage of 2.5 volts, 1.05 lb. of sulfur per kilowatt-hour can be oxidized theoretically.

One basis of calculation is the pounds of sulfur oxidized per kilowatt-hour,

TABLE 1—COSTS OF UTILITIES STEAM REGENERATIVE VS. ELECTROLYTIC REGENERATIVE PLANTS

	Dollars per 1,000 bbl. of gasoline treated	
Steam—	Steam regenerator	Electrolytic regenerator
25-psi. stripping steam and heating	$4.80	$0.56
150-psi. heating steam	10.67	
Cooling water	0.30	0.05
Electric power pumping and lighting	0.13	0.12
Electric power regenerator		1.14
Operating utilities cost	$15.90	$1.87

Cooling water at $0.0008 per 1,000 gal.; power at $0.009 per kilowatt; steam (150 psi.) at 65 cents per 1,000 lb.; steam (25 psi.) at 24 cents per 1,000 lb.

and may be determined by the following equation:

$$\theta = \frac{Qd\,(S_1 - S_2)\,(1{,}000)}{AV\,(24)}$$

Where:

θ = pounds of sulfur per kilowatt-hour
Q = flow rate of caustic solution, barrels per day
d = density, pounds per barrel of caustic-soda solution
S_1 = mercaptan sulfur in spent caustic, per cent by weight
S_2 = mercaptan sulfur in regenerated caustic, per cent by weight
A = amperage
V = voltage

The operating utility costs have been presented to indicate a cost comparison for the regeneration of spent caustic, both by steam regeneration and A.D.C. electrolytic regeneration, as in Table 1. The A.D.C. electrolytic regenerator process is estimated to save more than $40,000 annually on operating utilities alone.

Operating Data

Commercial-plant operating data are summarized in Table 2. The pounds of mercaptan sulfur removed from the

TABLE 2—PLANT-SCALE OPERATING DATA

Flow Rates

Straightrun gasoline, bbl. per day	3,000 to 3,500
Dubbs gasoline, bbl. per day	5,000
Caustic solution, bbl. per day	1,700
Power, kilowatt-hours	40

Analyses of Gasolines

	Straight-run	Cracked
Gravity, °A.P.I.	66.6	54.9
R.v.p., psi.	8.0	10.5
A.S.T.M. distillation, °F.:		
Initial boiling point	102	108
10 per cent point	146	172
50 per cent point	209	291
End point	311	408

	Steam-regenerated	A.D.C.-regenerated
F-3: Milliliters of TEL per gal. to bring to common octane number	2.95	2.80
Mercaptan sulfur removed, lb. per day		215

Analysis of Treating Solution

Gravity, °Baume	17.6
Sulfide sulfur, per cent by weight	0
Mercaptan sulfur removed, lb. per day	210

gasoline should equal the pounds of mercaptan sulfur removed from the caustic solution. The Shell precision electrometric titrator was used to determine the mercaptan sulfur in both the gasoline and caustic solutions.

Advantages of the A.D.C. electrolytic regeneration over the conventional steam regeneration of caustic solution used in the extraction of mercaptans from gasolines are:

1. Reduced operating utilities costs from $15.90 per 1,000 bbl. of gasoline treated by steam regeneration to $1.87 per 1,000 bbl. by electrolytic regeneration.

2. Reduced maintenance costs due to

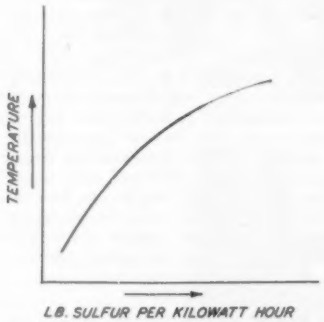


Fig. 4—Relationship of solution activity and temperature.

Fig. 5—Solution activity vs. per cent sodium-mercaptide.

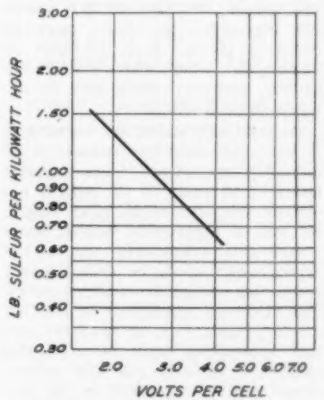


Fig. 6—Theoretical sulfur reduction vs. voltage per cell.

the elimination of high-temperature heat exchangers, coolers, and condensers. The absence of sodium sulfide (Na_2S) at elevated temperatures results in a minimum of corrosion.

3. Reduced capital costs due to the simplicity of design.

4. The disposal of mercaptan vapors is eliminated due to the formation of liquid disulfides when oxidized.

5. Appreciable savings in tetraethyl lead due to improved mercaptan-sulfur extraction from gasoline: Tetraethyl lead savings of $15 per 1,000 bbl. of gasoline blend are indicated in Table 2.

6. Approximate inhibitor savings of one-half the amount used in steam regeneration: Heated caustic solutions from steam regeneration resinify organic matters extracted from the sour gasoline, and contribute to the high copper-dish gums and decrease the inhibitor susceptibility.

7. Annual consumption of reduced caustic soda.

Disadvantages of the process are:

1. Utilization of high voltage and currents presents necessary hazards which must be met with proper safety precautions.

2. Plant treating solutions must be filtered to keep cell diaphragm clean.

3. The cell and rectifier must be housed to keep dry.

Jet-Nozzled Rock Bits

(*Continued from page 79*)

equipment have found it profitable to adopt a program of changing pump liner size during the drilling of a well. The larger size liners are used when drilling in the top section of hole. The relatively higher volumes obtained by the use of the larger liners are used to produce increased jet velocities.

In some cases series compounding and parallel operation of two pumps has been used to obtain increased hydraulic power. It is advisable to consult the pump manufacturers regarding problems which may be involved in such operations.

As previously stated, the use of 9½-lb. per gallon mud was assumed in all examples considered. Since pressure losses in all parts of the system are directly proportional to mud weight, the use of appreciably heavier muds would also appreciably reduce the depths which could be drilled before pumps are loaded to rated capacities. The effect of restrictions in the hydraulic system, such as small-size surface connections, small drill pipe, and small bore or large o.d. drill collars, should not be overlooked in the consideration of actual field problems.

It is not to be assumed that circulation rates and jet velocities used in the examples are optimum values. In some cases where hydraulic equipment is rather high powered, the individual operators involved have successfully used much higher circulation rates and jet velocities. In other cases, somewhat lower values have been used successfully.

Applications of Jet Rock Bits

At present, the greatest application of jet-type rock bits is along the Texas and Louisiana Gulf Coast, and the East Texas-North Louisiana area. The predominating formation along the coast of Texas and Louisiana is unconsolidated shale and sand streaks which vary from low to moderate strength. These formations are normally drilled with a soft-formation-type rock bit, and the high-velocity jet principle has materially improved performance of rolling cutter bits in these formations. Approximately 29 per cent of the rock bits run in this area are of the jet type.

In the East Texas-North Louisiana area, a portion of the formations is predominantly low strength unconsolidated shale, and soft-formation-type jet rock bits have shown marked improvement in performance over the same type of rock bit having conventional water courses. In this area, jet-type rock bits are also used rather extensively in drilling medium to high-strength formations. Approximately 27 per cent of the rock bits run in this area are of the jet type.

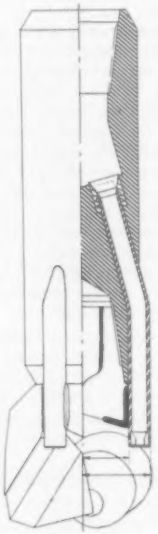
The percentage improvement in penetration rate and footage per bit varies widely, depending upon the formation encountered, type of drilling mud being circulated, weight applied upon the bit, rotary speed, and efficiency of the drilling personnel.

The following data will illustrate some of the variations in improvement of performance which have occurred. The data are not based on field or area averages but were obtained in each case by comparing performance between a single jet drilled well and an offset conventionally drilled.

The previously mentioned extent of jet bit usage does not appear to be the ultimate. Jet bits are presently being manufactured in most of the popular sizes and types for drilling the unconsolidated sand and shales to medium high strength formations. A limited quantity has been manufactured in the hard-formation types.

In expediting jet-bit tests, some operators have been using regular bits assembled in jet subs as illustrated in Fig. 13. This is a quarter-section drawing showing the construction of the jet sub and its relationship to the bit.

During the past year, experimental runs with jet-type rock bits have been made in West Texas, California, Oklahoma, Rocky Mountains, Illinois, Canada, and Venezuela. The results obtained in formations consisting largely of moderate to low-strength shales is



JET SUB construction and relationship to bit (Fig. 13).

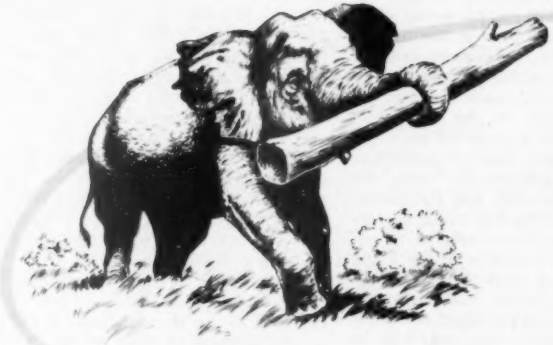
comparable to the results recorded along the Gulf Coast of Texas and Louisiana. In the harder high-strength rocks, such as those encountered in the Permian basin of West Texas, jet rock bits have shown an improvement compared to conventional rock bits; however, additional runs will have to be conducted to provide additional data before final evaluation of the jet-type rock bit can be made in this area.

In some areas a large number of the rigs do not have adequate pump capacity for efficient jet bit operation and tests to date have not been encouraging.

In general, jet-type rock bits properly operated show improvement compared to conventional rock bits when run on rigs having adequate hydraulic capacity, although in some formations or under some operating conditions, such as the use of very light weight on the bit, the improvement may be negligible and the additional expense involved in running a jet bit is not always justified.

References

1. "Mud Flow in Drilling," by R. J. S. Pigott, A. P. I. Drilling and Production Practices, 1941, pp. 91-103.



MASSIVE construction means strength — STRENGTH in the substructure and mast legs. Here is the very picture of STRENGTH.

This design is typical of Lee C. Moore construction.

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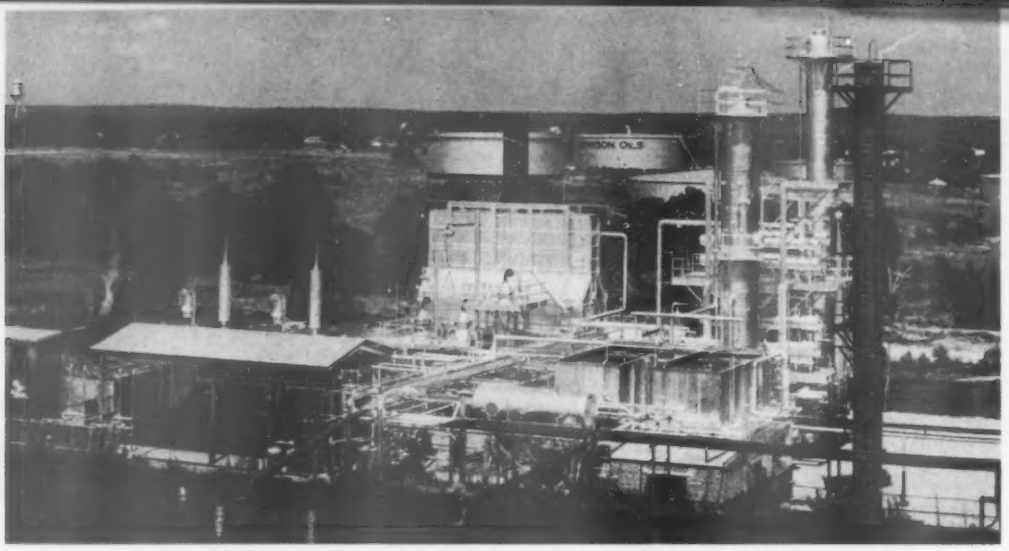


View of Johnson Oil Refining Co. plant at Cleveland, Okla. Platformer section is in center.

Here's how a small refinery solved the problem of

Making Premium-Grade Motor Fuel . . .

Platforming proves happy solution in plant producing large percentage of straightrun and burning oils

by W. J. Leenhouts

THE Johnson Oil Refining Co. plant at Cleveland, Okla., has a crude-oil charge capacity of 7,000 bbl. per day, thermal cracking capacity of 3,000 bbl. daily and has had in continuous operation for the past 10 months a Platforming unit with a capacity of 1,840 bbl. per day. By adding this catalytic reforming capacity the company is in a position to upgrade some 50 per cent of its gasoline to an octane number of 95 plus. Its entire yield of gasoline could be made into a premium-grade, 90 to 92-octane material, if desired.

Before installing this unit a careful study was made to determine the most economical means of manufacturing high-octane motor fuel. One primary consideration was that the company has an established market for burning oils and makes a rather high percentage of No. 1 and No. 2 heating oils and diesel fuel and it was not desired to disturb this production.

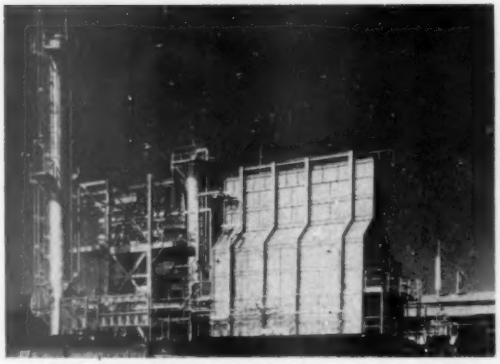
It was apparent that the greatest gain in octane could be made by improving the straightrun gasoline. The refinery has a good thermal cracking plant but no reforming facilities, although about 300 bbl. per day of naphtha could be reformed in the light-oil coil of the Dubbs thermal cracking unit. It was realized that any major improvement in octane number involves treatment of the straightrun naphtha because it represents the major part of the total gasoline production. However, it appeared after study was made of the problem that thermal reforming of this fraction would be very costly if proper yield were to be obtained and the antiknock quality would still be low and short of the goal desired by management. For a small refinery, with limited facilities, which must depend on a simplified type of operation, the Platformer looked like the best solution.

Process Operations

Salt content of crude oil processed at Cleveland may vary from 50 to 400 lb. per 1,000 bbl., according to type of crude, storage time, or season. Desalting reduces this to about 1 or 2 lb. per 1,000 bbl.

Crude distillation . . . The crude is then charged to a battery of shell stills. Gasoline is taken off in two fractions. The first cut is a 78° to 80°-gravity fraction. This gasoline has a sufficiently high octane number and does not need further treatment except a caustic wash. The remaining fraction of gasoline, which may run as high as 400° F. end point is used as charge stock for the Platforming unit. The crude is then further distilled to take off fractions of kerosine, Nos. 1 and 2 burning oils and diesel fuel. The above fractions comprise about 25 to 30 per cent of the crude oil. The remaining residue or topped crude is used as charge stock for thermal cracking and usually amounts to about 42 per cent of the crude.

The crude on which Johnson Oil Refining Co.'s plant operates is a typical Mid-Continent crude which contains about 30 per cent of gasoline with an end point of 385° F. This gasoline has a rather low (0.025 per cent) sulfur content. Gasoline fraction, amounting to about 25 per cent based on crude-oil charge, is sent to the Platforming unit for upgrading. This gaso-



View of Platforming section at Johnson Oil Refining plant.

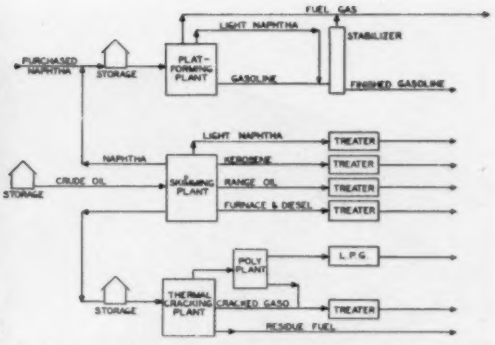


Fig. 1—Flow sheet showing operation of Johnson Oil Refining Co. plant at Cleveland, Okla.

line is well fractionated and is free of heavy ends. At the present time the refinery is making a 57.5° - gravity gasoline which is already stripped of most of its light ends before it goes to the prefractionator of the Platforming unit.

The material drawn off the prefractionator constitutes the reactor charge, and this has a gravity of approximately 56, an initial boiling point of 180° F., an end point of 385° F., and a clear octane number of 40 to 45. It is this gasoline that is upgraded by Platforming to a product of 76 to 85 octane clear or 90 to 95 octane with the addition of 3 cc. of lead.

Catalytic reforming . . . The Platforming unit built for Johnson Oil Refining Co. differs in a number of ways from the original unit, built for Old Dutch Refining Co. in 1949, or that built for Kendall Refining Co. early last spring. The Johnson unit has a single furnace divided into three cells, each of which houses a separate coil installation. The furnace is a center wall updraft radiant heater. A prefractionator, and stabilization equipment complete the Platforming facilities.

Gasoline goes to the prefractionating tower where light ends and bottoms are removed. The side-cut stream from the tower is discharged through the Platformer, mixed with the recycle gases made in the unit. These gases consist of hydrogen in a concentration of about 85 per cent. The Platforming process makes very little hydrocarbon gas. In addition to hydrogen other gases are methane, ethane, and propane. All butane is retained in the platformate. The process can produce a product with a Reid vapor pressure as low as 4.5 lb. or as high as 7.5 lb., depending on the severity of operation. Light overhead material from the prefractionator can be stabilized with the Platforming product made, or can be

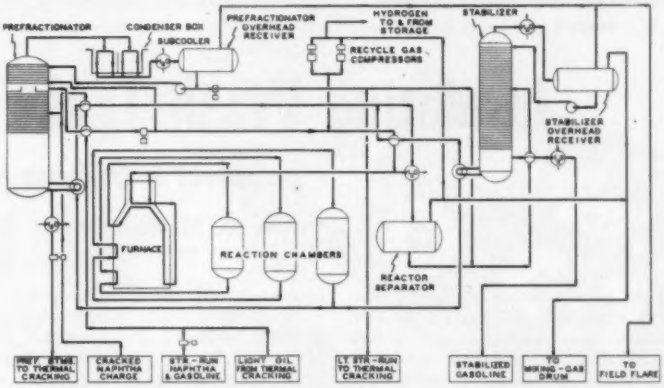


Fig. 2—Flow sheet for Johnson Platformer operation.

sent to the cracking plant stabilizer. Product from Platforming is a finished product and does not need further treatment. It goes directly to storage.

Analytical control . . . Various laboratory data must be compiled and analyzed in order to control the operation of the Platforming unit. Essentially the data consist of check tests, by laboratory distillation, on the reactor and prefractionator charge and on the stabilized platformate.

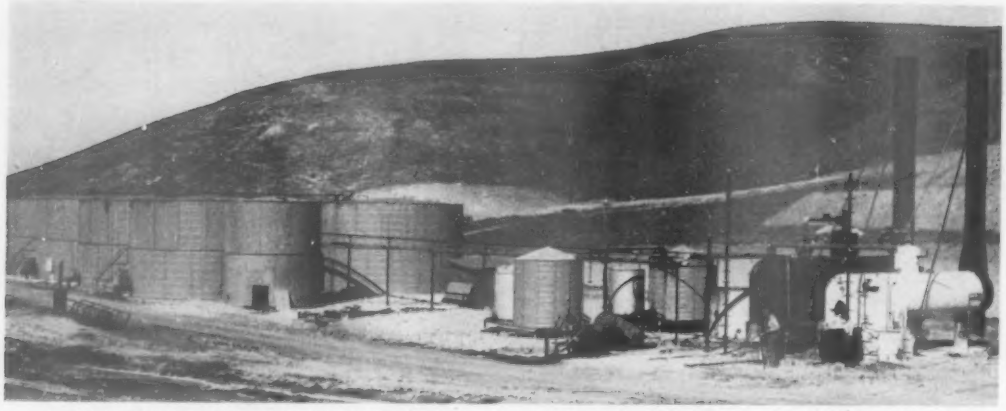
Use of these distillations guides the operator in regulating the fractionating columns to produce a satisfactory feed and to obtain a suitable product. The stabilizer reflux, prefractionator overhead, reactor feed, and bottoms are analyzed daily. A.S.T.M. distillations are run to insure prefractionation charge stocks of reasonably uniform characteristics. Occasionally determinations of octane number and total sulfur content are made on the contents of the charge-stock tanks. The finished high-octane gasoline taken from the

(*Continued on page 101*)

THE AUTHOR

As refinery manager of Johnson Oil Refining Co., Cleveland, Okla., refinery, the author of this article had the primary responsibility of determining the best and most economical method by which high-octane motor fuel could be produced at this refinery. After obtaining an M.S. degree in chemical engineering, Leenhouts was chemist with Central Refining Co., at Lawrenceville, Ill., which had been organized in 1909 by the Johnson family and other interests. Central Refining was sold to Indian Refining Co., with which organization Leenhouts remained as research chemish for 4 years before coming to Johnson Oil Refining at Cleveland in 1925 where he has held the positions of refinery superintendent and refinery manager since 1944.

The Johnson Oil Refining Co. Cleveland refinery began as a small 600-bbl. per day skimming plant in August 1922 but was immediately enlarged to 5,000-bbl. daily capacity. In 1937 a Dubbs two-coil selective cracking unit was installed, in 1939 a catalytic polymerization unit, and in 1944 the company added Petreco electric desalters, a Unisol treating plant, and a catalytic desulfurization unit. The newest installation is the Platforming unit described in this article.



Insulated tank battery in San Ardo field, California. Crude oil purchaser requirements call for shipments to be made at 180° F.

Insulating Wash Tanks Pays Off

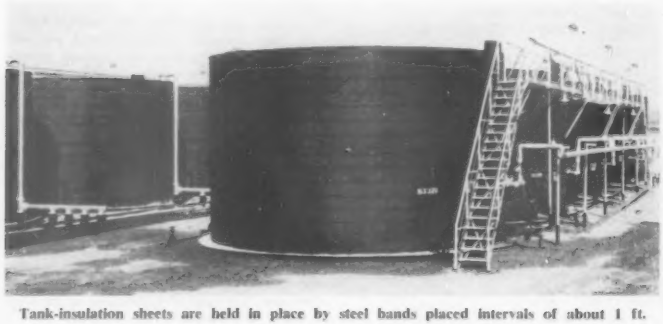
. . . payout in California rendered in less than a year

by D. H. Stormont
West Coast District Editor

BECAUSE suitable, low-priced insulating materials were not available, and because gas normally used as field fuel was not commanding the prices it does today, California operators a few years ago accepted heat losses encountered in treating heavy crudes as a matter of course. They were aware of these high losses but the cost of insulating a wash tank, or stock tank, was too much to offer a reasonable payout.

Today, insulated wash tanks and stock tanks are the rule rather than the exception at low-gravity, wet oil batteries. The fuel savings being effected by the low-cost insulation generally renders a payout in less than a year. Added benefits are decreased heating equipment requirements, lessened heater maintenance, and in many instances, improved wash-tank performance.

Because of the high percentage of heavy crude produced, treating temperatures employed in California fields probably average higher than in other oil-producing areas. About 50 per cent of the currently produced crude in California is less than 25° A.P.I. gravity, with average water cut running in excess of 60 per cent. Separation of water from the low-gravity crudes is slow at normal temperatures. Consequently wash-tank temperatures in the order of 150° to 180° F. are usually maintained. Likewise, due to the high viscosity of these heavy crudes, maintenance of stock-tank temperatures near this range is usually necessary to reduce pumping pressure where appreciable volumes are transported.



Tank-insulation sheets are held in place by steel bands placed intervals of about 1 ft.

Since atmospheric temperatures in California fields, on a year-around basis, approximate 70° F., a differential of about 100° F. often exists between the heated tanks and the atmosphere. Heat losses from just one uninsulated tank under these conditions can result in a fuel equivalent of 5,500 M.c.f. of gas annually. With natural gas costing $0.15 per M.c.f., this heat loss represents an annual expense of about $825.

Until 1944, when the first California tank was insulated with "Celo-siding" sheets, an expenditure of approximately $2,000 was required to insulate a 1,500-bbl. tank. The payout time using the materials then available was too long to justify insulation except where it was demanded because of insufficient heater capacity.

Using Celo-siding, which has an efficiency of about 80 per cent, today a 1,500-bbl. tank can be insulated for about $800 on a contractural basis. Inexperienced company crews probably cannot perform the job any cheaper but once equipped with the proper know-how and tools a considerable savings can be made.

Sheet fiber glass can be installed at a comparable cost, but this material has not been as widely used. Sheet

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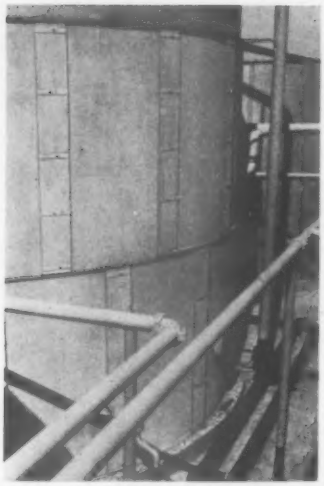

Wash tank in Wilmington field on which insulation is retained with clips instead of bands.

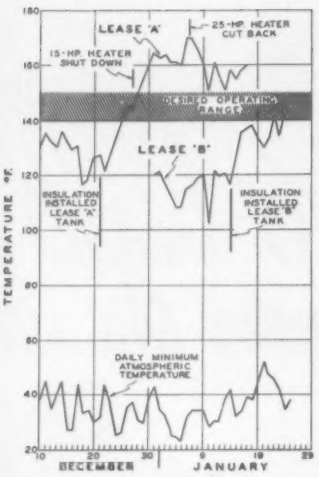

Fig. 1—Plot of observed midtank temperatures of wash tanks in West Newport field.

fiber glass offers better insulating qualities and better fire resistance than Celo-siding but its salvability is slightly less. Likewise it does not offer as easy access to the outside of the tank if a leak develops.

Insulation Economics

The amount of heat lost from an uninsulated tank depends primarily on tank and atmospheric temperatures. Where a tank temperature of 180° F. is maintained in an atmospheric temperature of 65° F. heat loss from a 1,500-bbl. uninsulated bolted steel tank surface is about 4 B.t.u. per hour per square foot per degree temperature difference, as shown in Table 1.

Approximate heat savings to be gained through insulation with Celo-siding, fiber-glass sheets, and insulating cement, as well as the installed cost of each and length of payout required, are also brought out in Table 1. Under the conditions indicated, either Celo-siding or glass-fiber sheets show a 1-year payout with the installation being performed by a contractor. Insulating cement would require almost 3 years to pay out because of its high cost and lower thermal efficiency.

These data are supported fairly well by actual tests run on two wash tanks in West Newport field of Orange County. The operator of these wash tanks estimates that the cost of Celo-siding insulation was repaid in one year, either in fuel saving, increased efficiency of cleaning oil, or lessened heat-equipment requirements. Fuel savings and payout computations made by the operator are given in Table 2.

At these two leases the wash-tanks are 500-bbl. bolted-steel units. Lease "A" heating equipment consists of two heaters, one rated at 25 hp. and the other at 15 hp. At lease "B" heating equipment consists of two 25-hp. units.

In both cases maintenance of midtank temperatures of 140° to 150° F. was desired, so that water could be quickly and efficiently removed from the crude oil. Since the crude oil purchaser requires that the shipped oil be hot, utilization of the heat carried over from the wash tanks and shipment of the crude oil as fast as a tank was filled, was also desirable. As shown in Fig. 1, the desired wash-tank temperatures were not being reached at either tank, prior to installing insulation.

Since insulating, the 15-hp. heater on lease A has been shut down and the 25-hp. heater cut back. Even with fuel consumption cut about one-half, midtank temperatures in the desired operating range are being attained whereas they formerly could not.

At lease B, where the two 25-hp. heaters operating at capacity had been unable to maintain the desired wash-tank temperature, insulation of the tank resulted in obtaining the desired operating temperature. Since the tank temperatures plotted in Fig. 1 were taken in December and January, during most of a year some reserve heater capacity will be available because of insulation.

Methods of Installing

Because the majority of California

(*Continued on page 94*)

TABLE 1—INSULATION COSTS FOR VARIOUS MATERIALS
(Installed on a contractural basis on a 1,500-bbl., three-ring steel tank in Kern County field)

Fixed factors:	
Circumferential area, sq. ft.	1,620
Average temperature of heated oil, °F.	180
Atmospheric mean annual temperature, °F.	65
Difference in temperature, °F.	115
Annual heating period (350 days, 24-hour day), hours	8,400
Heating value of natural gas, B.t.u./cu. ft.	1,000
Estimated cost of gas, cents/M.c.f.	15
Heat loss from uninsulated tank, B.t.u./hr./sq. ft./°F. temperature difference	4

Factors of various insulating materials:	Celo-siding	Sheet glass	Insulating cement
Material thickness, in.	⅞	1	1
Estimated insulating efficiency, per cent	85	90	75
B.t.u. savings, hr./ft./deg.	3.4	3.6	3.0
Annual heat savings, 1,000 B.t.u.	5,321,000	5,634,000	4,695,000
Annual gas savings, M.c.f.	5,321	5,634	4,695
Annual savings, dollars	$798	$845	$704
Installation cost, per sq. ft.	$0.50	$0.50	$1.30
Installation cost, total	$810	$810	$2,119
Annual return on investment, per cent	99	104	33
Salvability, per cent	100	95	0

TABLE 2—ESTIMATED FUEL SAVINGS GAINED BY INSULATING TWO WASH TANKS IN WEST NEWPORT FIELD

Operating conditions: To maintain a wash-tank temperature of 150° F. with an average outside temperature of 50° F. during 3 months of the year and 75° F. during the other 9 months. Area of tank insulation, 540 sq. ft.; assumed boiler efficiency, 10 per cent; cost of natural gas, 13 cents per M.c.f.

	Temp. difference 100° F.	Temp. difference 75° F.
Noninsulated heat loss, B.t.u./hr./sq. ft.	180	130
Insulated heat loss, B.t.u./hr./sq. ft.	40	30
Heat savings, B.t.u./hr./sq. ft.	140	100
Heat savings per tank, B.t.u./hr.	75,600	54,000
3-month heat savings (2,190 hours), 1,000 B.t.u.	166,000	
9-month heat savings (6,570 hours), 1,000 B.t.u.		355,000
Fuel saved, at 1 million B.t.u./M.c.f., M.c.f.	166	355
Fuel saved with 10 per cent boiler efficiency, M.c.f.	1,660	3,550
Total fuel saved, M.c.f.	5,210	
Value of fuel saved annually (13 cents per M.c.f.)	$675	
Cost of insulation	$540	

Will Oil Be Found In South-Central Nebraska Portion of the Salina Basin?

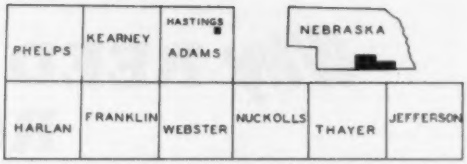

Fig. 1—County placement map of area described in article.

by R. L. Gilmore

SURFACE indications supported by subsurface geology justify expectations that deposits of oil and gas in commercial quantities will be found in the south-central Nebraska portion of the Salina basin.

The sedimentary section in the basin contains the necessary reservoir and source beds for the accumulation of petroleum. Much of the area in Harlan, Franklin, Webster, Nuckolls, Thayer, Jefferson, Adams, Kearney, and Phelps counties will probably be proven productive with a successful exploration program. Drilling operations in the area are to begin soon at a number of locations.

Structure

A number of buried ridges extend across Harlan, Franklin, Webster, and Nuckolls counties, trending in a northwest-southeast direction. (See Fig. 2.) These structures were established by correlating logs of drilled wells. (See Fig. 3.) The Rosemont high trends in a northwest-southeast direction, and Section I-I' water well W 100B47 is about on the axis of the high to the immediate southeast of Rosemont. The test holes for the most part drilled through the Pierre shale, and into the Niobrara, of Cretaceous age. Cross-sections H-H' and I-I' show certain aspects of the Upper Cretaceous (Niobrara shales) in Fig. 4.

The ridges can be traced on a topographic quadrangle sheet even though erosion has erased most of the specific lines of continuity. Seismograph work in Franklin and Harlan counties reveals that extensions of these ridges, or other parallel ridges, extend a short distance southeast into Kansas. The Harlan County high is from all indications a minor fold. Apparently the major folding of this parallel series is in Webster County.

These structures are en echelon to the Cambridge arch and are roughly parallel to a series of structures rising in the Central Kansas uplift where commercial oil production is found. Correlations of test well logs confirm that the post-Cretaceous folding extends down through the Arbuckle. Cross-sections made from these correlations reveal that these structures plunge toward the southeast and there

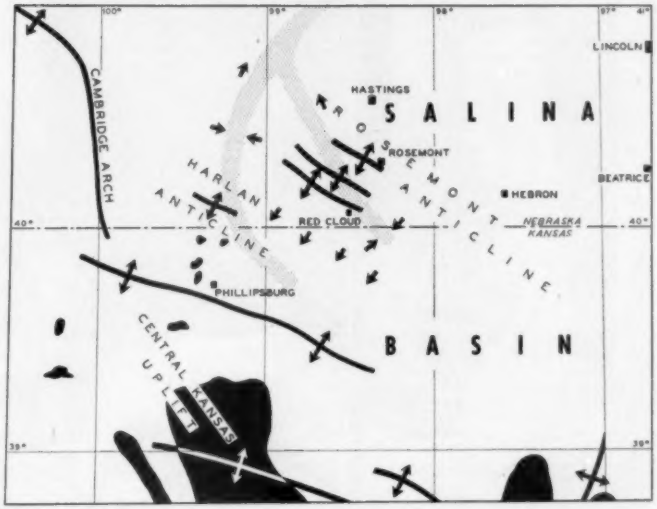

Fig. 2—Geologic map of Salina basin showing synclines and structural highs.

is considerable closure on some of the principal underlying formations.

Salina basin.—When measured in an east-west direction across the south-central part of Nebraska the Salina basin is more than 200 miles wide. The regional dip of the formations found in the basin farther south in Kansas show an average updip to the north of about 4 ft. per mile. This uniformity of updip continues from Kansas to the north side of the Republican River, in Webster County, near Red Cloud where the rate of updip changes very sharply. After Cretaceous depositions, the region was tilted toward the north and northeast and elevated above sea level. Compressional folding at that time could well be the answer to the series of northwest-southeast plunging anticlines in these counties.

There are many producing oil and gas fields along the southeast and west edges of the basin in Kansas. The source origin of the oil and gas found in these Kansas fields is undoubtedly from the sedimentary beds farther out in the basin. The conclusion is that the structures existing in the south-central part of Nebraska are ideally situated to trap oil and gas migrating upstructure from the south.

Stratigraphy

Cambrian - Mississippian. — Nearly all of the 20 test holes drilled in Harlan County have penetrated the Arbuckle, the top of which averages 1,800-1,900 ft. below sea level. The

THE AUTHOR

R. L. Gilmore is a consulting mining and petroleum engineer, having been associated with major and independent oil companies. He reports that he is currently engaged in geological and geophysical exploration surveys in states west of the Mississippi River and abroad, and is also operating and developing mining properties in the southwestern United States. Gilmore helped in the formation of the Independent Petroleum Association of America 20 years ago and he is also one of the founders of the Mining Association of California.

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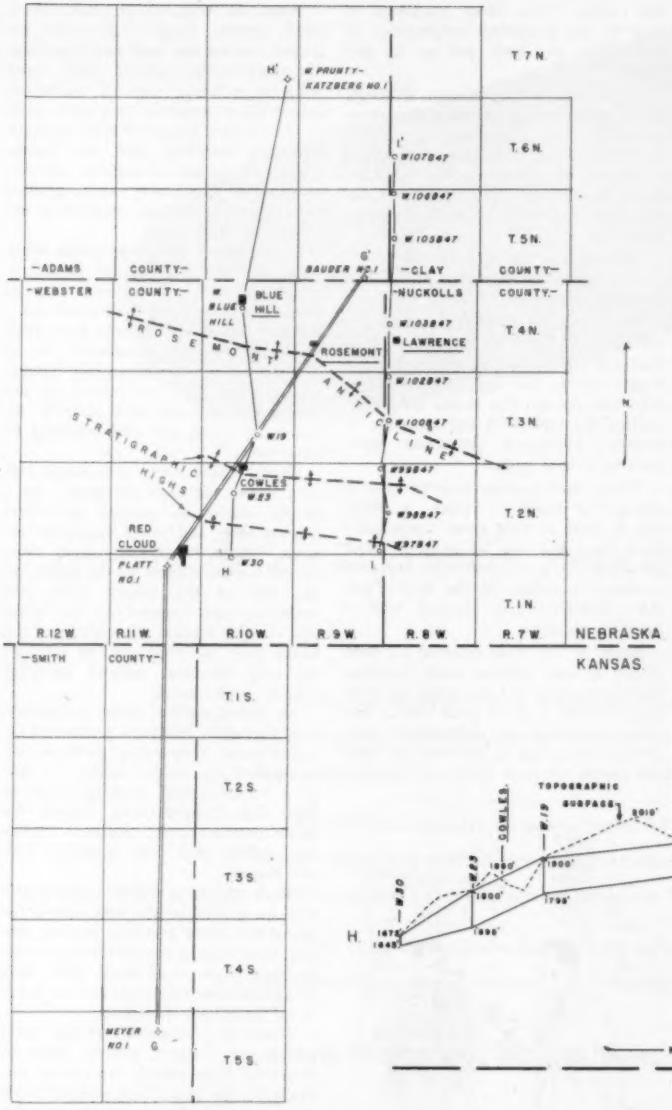

Fig. 3—(Above) Map showing location of wells used for cross-sections which extend from the Platte River south to the Republican River to the lower part of Smith County, Kansas.

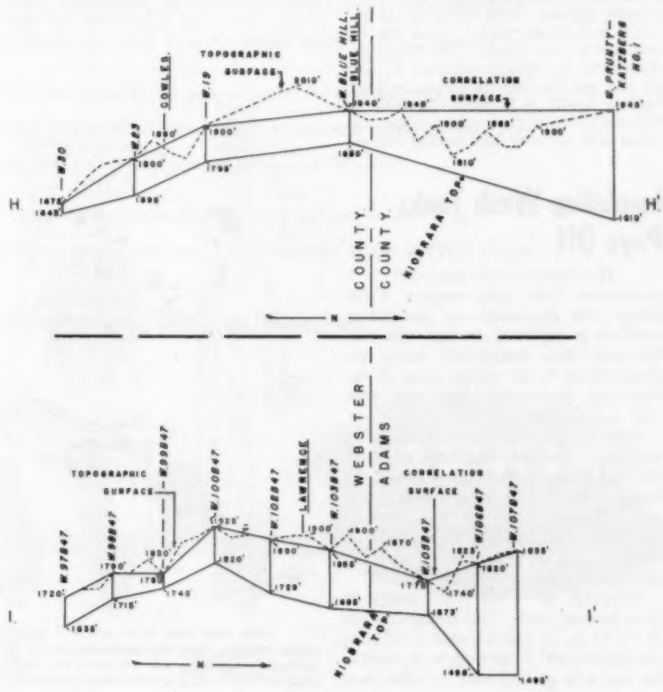

Fig. 4—(Right) Geologic cross-sections H-H' and I-I' showing the topographic and structural high in the Niobrara-Cretaceous formation of Rosemont area.

Arbuckle is about 340 ft. thick in the southeastern corner of Franklin County. Deep-well logs reveal that the Viola is about 237 ft. thick in this area, narrowing down to 30 ft. in the western part of Harlan County. The Hunton is also found to underlie a portion of the Nebraska section of the Salina basin. The Mississippian underlies a part of the same area, ranging from 75 ft. in thickness in southeastern Franklin County to a complete absence in southern Harlan County.

The American Association of Petroleum Geologists' "Possible Future Petroleum Provinces of North America" states that widespread unconformity followed the deposition of the Mississippian formation and that uplift and peneplanation truncated formations from pre-Cambrian granite through the Mississippi lime.

Deep-well logs bear out the report of the A.A.P.G. in regard to the truncation of the Viola, Hunton, and Mississippian formations. C. E. Condra, director of the State Geological Survey of Nebraska, also confirms this in his compilation of geological data of Nebraska.

Pennsylvanian.—Data compiled by Wallace Lee, Constance Leatherock, and Theodore Botinelly, of the Kansas Geological Survey and the U. S. Geological Survey, point out that there is a local thickening of the Pennsylvanian rocks in Franklin and Webster counties. At Red Cloud in Webster County, the Pennsylvanian rocks

at Price 1 Platt (see Fig. 3) are 1,230 ft. thick, the Lansing-Kansas City and Bronson series about 270 ft. thick. The Pennsylvanian formations in southeastern Franklin County are approximately 1,066 ft. thick, the Lansing-Kansas City series 264 ft. thick. In Harlan County the Pennsylvanian thins to 999 ft. In Adams County 1,185 ft. of Pennsylvanian strata have been penetrated at Ohio 1 Bauder. (See Fig. 3.) However, the Pennsylvanian formations in Franklin and Webster counties are about 50-350 ft. thicker than those of certain oil producing areas further south in Kansas, according to well logs.

Permian. — The Permian averages about 1,375 ft. thick in southern Harlan County, 1,274 ft. in Franklin County, thinning to 1,255 ft. at Price 1 Platt in Webster County. There is also thinning of the Permian to the north of Webster County in Adams County where logs find the Permian to be 125 ft. thick at Ohio 1 Bauder.

Cretaceous.—The Dakota formation in southern Adams County is 412 ft. thick at Ohio 1 Bauder while it thins out to the south in Webster County at Price 1 Platt to 296 ft. In Franklin County the Dakota thickens to 325 ft., and in Harlan County the thickness is even more pronounced, averaging 470 ft.

Conclusion

Future drilling in south-central Nebraska will bring to light further confirmation of the subsurface structures already known. That these structures might constitute major traps for oil and gas is very likely. The Nebraska structures are ideally situated to trap oil and gas moving up structure from further south in Kansas. Drilling in this area will begin soon and the outcome will be very interesting indeed.

Insulating Wash Tanks Pays Off

(*Continued from page 90*)

production tank jobs employ Celo-siding, this discussion on installation methods is confined to that material. Likewise since bolted-steel tanks are predominate in the region, most of the following deals with how this type tank is insulated.

First installation with Celo-siding was on a 1,500-bbl. wash tank in Fruitvale field near Bakersfield. Today the material looks as good as when it was applied in the spring of 1944. Payout on this job was estimated at 9 months, based on gas savings only and with gas costing 10 cents per M.c.f.

Available in 4 by 8-ft. sheets at most lumber yards, Celo-siding consists of 25/32 in. of Celotex plus a 3/32 in. coating of 250° F. melting-point mastic. On one side ground slate is rolled into the surface. This ⅞-in. thickness of material has a thermal conductivity of 0.44 B.t.u. per hour per sq. ft. per degree F.

Application is quite simple, although different techniques are used by various companies and contractors. Generally, however, all use tank hangers to eliminate need for erecting costly scaffolding. Likewise the top ring is insulated first and other rings taken in descending order.

In applying the material to bolted tanks the procedure followed by one company is:

The standard 4 by 8-ft. sheets are cut back ½ in. on their length so that they will slip under the chimes and fit snugly against the tank without flange bolts interfering. The sheets are placed against the tank with the cut edge at bottom. Maximum protection from weather is thus gained.

Where steel banding is to be used to clamp the sheets in place, a chalk line is used to hold them temporarily until the entire ring is covered. When all are set, a ¾-in. steel band is placed around the center of the sheets, and then tightened and cinched with a banding machine.

Strips of 1-ft. wide material are then placed at each vertical joint, covering the bolting area and providing an overlap of about 2 in. on each sheet. The same procedure of temporarily supporting the strips is followed as with the sheets.

". . . Well, now that we've seen the seismograph reports, read the abstracts, heard the geologist's opinions, and inspected the leases, shall we flip a coin to see where we'll drill?"

When all strips are in place, ¾-in. bands spaced about 1 ft. apart are placed around the tank and tightened. To temporarily support each band while it is being installed, nails are driven (later removed) into each sheet at the correct height. Where cleanout manholes interfere with the bands, clamps or frames of suitable size are provided so that bands can be applied and tightened without obstructing access to the man holes.

Until some 2 years ago bands solely were used for holding the insulation in place. With development of the Dinwiddie removable insulation clip*, however, many bolted tanks have been insulated using this method. As is shown in an accompanying photograph, these clips are placed on the overlap strips and are secured by means of a nut and stud attached to tank bolts.

Should a leak occur at a bolted section, where the clips are used it is a simple matter to remove the overlapping strip and make necessary repairs. Where banding is used, short splices can be clipped to the bands on one side of the overlap strip, run under it, and clamped on the other side. In this manner the portion of the bands over the strip can be cut and the strip removed without lessening tension of the bands.

As stated earlier, most production tank insulation has been performed on bolted tanks. Celo-siding, however, can be applied on welded tanks. In fact at a large central treating plant in West Cat Canyon field, almost the entire circumferential area of a 55,000-bbl. welded tank was insulated with this material.

When applied to welded tanks, angles may be welded to the tank above the top of the upper sheets to prevent rain and snow seeping behind the insulation. Or lightweight sheet-metal strips may be slipped over the top sheets for additional protection if desired.

Where large-diameter welded tanks are to be covered, slotted strips of structural angle usually are welded vertically to the tank. This permits banding to be applied in reasonable lengths. At the West Cat Canyon tank, segments of slotted 1½ by 2-in. angles were welded at 40-ft. intervals around the tank.

Acknowledgment

Appreciation is expressed to Superior Tank & Construction Co. for supplying the data on which Table 1 is based, and to R. T. Dinwiddie, Inc., for the data on the West Newport installation and for the photo of the West Cat Canyon 55,000-bbl. tank.

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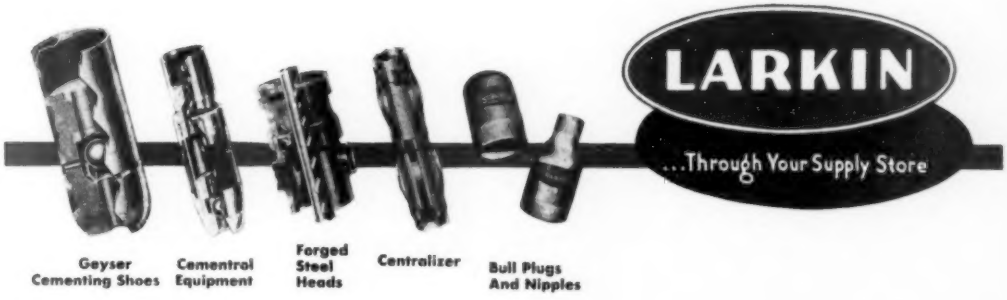
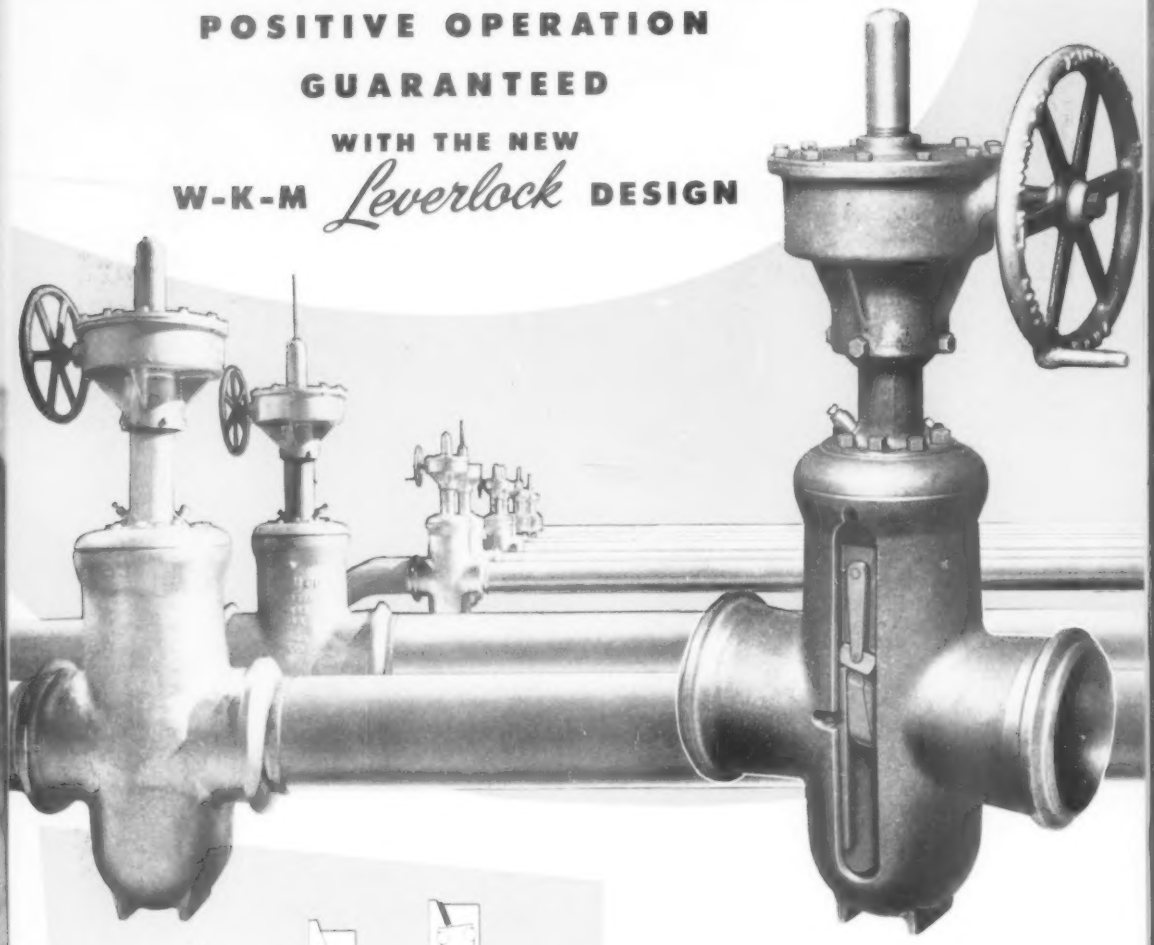


POSITIVE OPERATION GUARANTEED

WITH THE NEW W-K-M *Leverlock* DESIGN



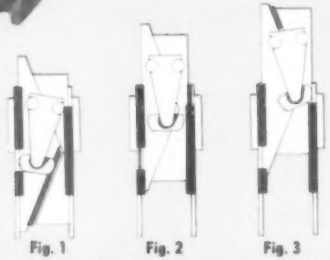


Fig. 1 Fig. 2 Fig. 3

The Leverlock Assembly is a mechanical device which positively holds the gate and segment in neutral position while the valve is being opened or closed, and permits expansion of the gate assembly at the proper time for seating in opened or closed position. A pin in the gate and one in the gate segment are linked together by means of the Leverlock arm. Guides or rails, integral with the seat skirts, provide for the proper movement of the Leverlock arm and shoe as well as guide the vertical travel of the gate assembly. Fig. 1 shows the gate and gate segment in closed position. When the valve is opened, the Leverlock arm swings to the right and travels between the guides on the seat skirt (shown in heavy black). As the Leverlock arm cannot swing to the right or left, it holds the gate and segment in neutral position positively, see Fig. 2. As the gate and segment reach the open position, the Leverlock arm swings into a slot provided on the seat skirt, see Fig. 3, thus permitting the gate and segment to expand against the seats. Clearances are shown in red on drawings above.

The Leverlock feature provides sure control over the gate and segment so that they expand only in open and closed position and remain in neutral while the valve is being operated.

Leverlock operation combined with the basic W-K-M Through-Conduit, expanding gate design provides a pipeline valve whose performance is unequalled in the most extreme service. Sure lever-action expansion guarantees that W-K-M Valves will always open or close freely regardless of service conditions. Leverlock Operation and other advantages such as vapor-tight seal against both seats, the ability to maintain and overhaul on the line, no-surge operation, and full through-conduit design assure the user of getting far more in valve performance for his money when his specs read, "W-K-M Valves All the Way."

W-K-M Valves

W-K-M COMPANY

P. O. Box 2117
HOUSTON 1, TEXAS
727 W. Seventh St., Los Angeles, Calif.
EXPORT OFFICE: 30 Rockefeller Plaza, New York, N. Y.

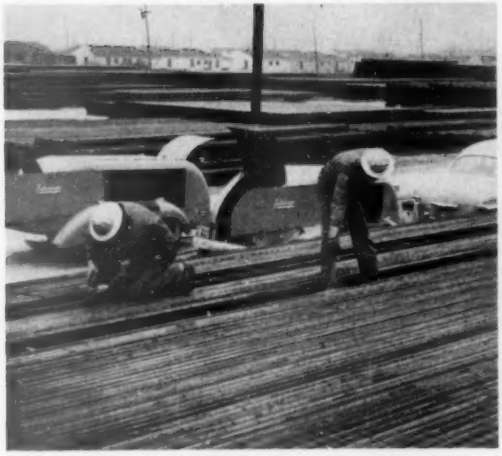


Fig. 1—Magnetic inspection of new pipe.

Fig. 2—Grinding and measuring depth of defect.

How to Reduce Fishing Jobs, Extend Life of Drill Strings . .

"... by setting up and properly using an inspection program on used drill pipe, some contractors have reduced fishing jobs . . . 90 per cent, while at the same time extending the life of the drill string as much as 100 per cent."

by R. S. Martin*

Fig. 3—Fatigue crack in bottom of external slug pit.

OIL men have long felt the need for a reliable and accurate means of inspecting tubular goods for mechanical defects. Despite the most careful drilling and producing practices, users must still consider the possibility of a failure of the tubular goods at a critical moment.

New Tubular Goods

The A.P.I. specifications on new tubular goods say that these goods will meet standards as to diameter, wall thickness, and weight within specified tolerances. All new pipe-inspection services are based upon these specifications.

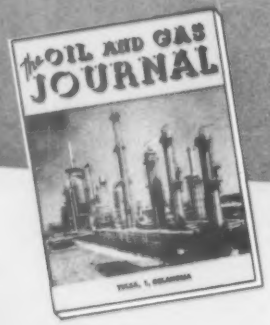
Several types of inspection are used to determine whether or not these tubular goods meet the A.P.I. standards. A complete inspection of new pipe includes magnetic inspection for the external surface, mechanical-optical inspection of the internal surface, drifting, and thread inspection.

*Engineering Division, Tuboscope Co., Houston. Presented before the A.P.I. Topical Committee on Drilling Practices, West Texas Section, February 6, 1952.

Fig. 4—Mechanical-optical inspection of new pipe.

Magnetic inspection . . . The pipe is given a magnetic inspection to determine the presence of mechanical defects, such as overlaps, seams, pits, and slugs on the external surface. The pipe is magnetized and sprinkled over its entire surface with iron filings. (See Fig. 1.) These filings will then outline any break in the metal.

After these defects are located, their depth is determined by grinding into a tightly bound flaw, such as a seam, or chiseling out an open defect, such



Journal-Guide to

UNITED STATES

LOCATIONS .....

DIST. V

DIST. IV

DIST. II

DIST. III

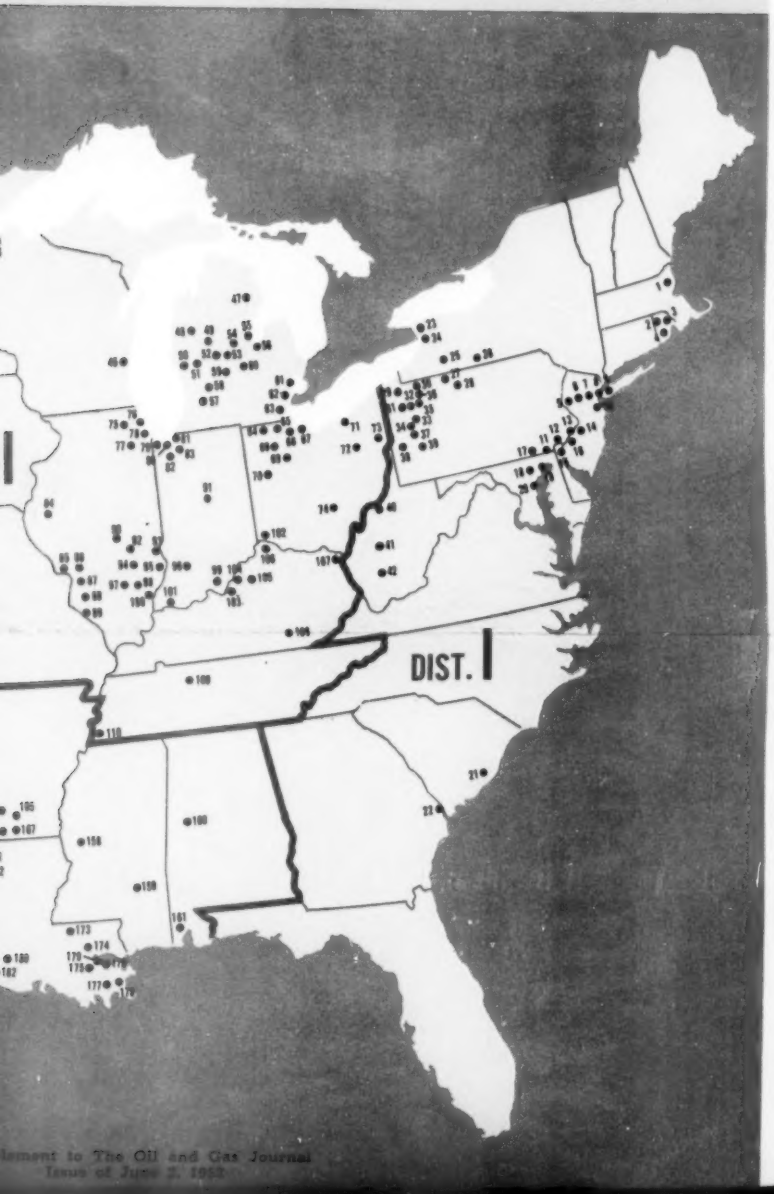
SUMMARY OF U. S. REFINERIES, THEIR DISTRIBUTION AND CAPACITY . . . 1952*

	Operating Plants			
		Crude oil cap.	Thermal operations cap.	Catalytic operations cap.
Alabama	3	9,500	23,900	21,000
Arkansas	9	64,500	267,350	227,000
California	45	1,093,300	9,900	3,000
Colorado	8	91,500		
Delaware	1	9,000		
Georgia	1	5,000		
Idaho	1	5,000	900	
Illinois	14	438,100	156,900	100,600
Indiana	9	402,950	113,100	112,750
Kansas	15	253,900	97,140	72,500
Kentucky	4	80,500	37,500	21,500
Louisiana	13	533,150	117,500	214,800
Maryland	3	68,500	13,000	27,000
Massachusetts	1	22,000	15,000	
Michigan	10	151,900	27,800	39,720
Minnesota	2	7,000	2,000	
Mississippi	3	9,000	18,500	20,000
Missouri	1	35,000	15,000	10,300
Montana	10	60,000	1,300	
Nebraska	4	10,900	85,600	168,000
New Jersey	6	438,000	7,400	6,000
New Mexico	9	20,050	29,500	18,000
New York	6	99,500	143,500	127,500
	12	306,600	113,850	91,750
	51	332,800		

Supplement to
Issue

ES REFINERIES....

..... CAPACITIES



lement to The Oil and Gas Journal
Issue of June 2, 1952

Nebraska	8	20,200	20,500	13,500
New Jersey	6	96,500	142,500	127,500
New Mexico	6	300,600	113,650	91,730
New York	21	322,800		
Ohio	1	6,000	138,250	175,475
Oklahoma	17	521,200	1,400	
Oregon	3	13,000		
Pennsylvania	1	7,500		
Rhode Island	2	220	1,200	2,500
South Carolina	2	7,000	564,620	579,800
South Dakota	64	2,088,345	10,500	24,000
Tennessee	5	58,750	1,000	
Texas	3	13,500	6,250	1,500
Utah	2	12,500	1,000	
Washington	2	9,000	25,050	32,500
West Virginia	16	101,210	2,236,310	2,175,295
Wisconsin	330	7,323,665	9,800	
Wyoming	32	130,575	2,246,110	2,175,295
Total operating plants	362	7,454,260		
Total idle plants				
U. S. Total				

*Barrels daily. †Includes various thermal processes. ‡Includes cracking and other catalytic processes.
Data from The Oil and Gas Journal. Refining Number, March 17, 1952.

REFINERIES IN THE UNITED STATES--

COMPILED 1952 BY THE OIL AND GAS

PAD DISTRICT 1

Company and location—	Crude oil cap., bbl. per day
NEW ENGLAND STATES (Mass. and R. I.):	
1. Esso Standard Oil Co., Everett	33,000
2. Amer. Bit. & Asph. Co., Providence	1,500
3. Soc.-Vac. Oil Co., E. Providence	6,000
4. Texas Co., Providence	2,500
Total	43,000
NEW YORK HARBOR AREA (N. Y. and N. J.):	
5. Esso Standard Oil Co., Linden	165,000
6. Cities Service Oil Co., Lindsey	15,000
7. Tide Water Assoc. Oil Co., Bayonne	80,000
8. Gulf Oil Corp., Staten Island	17,000
9. Soc.-Vac. Oil Co., Inc., Brooklyn	24,500
10. California Nat. Co., Perth Amboy	68,000
Total	369,500
PHILADELPHIA AND BALTIMORE AREA (Del., Md., N. J., Pa.):	
11. Sinclair Ref. Co., Marcus Hook	160,000
12. Sun Oil Co., Marcus Hook	140,000
13. Atlantic Ref. Co., Philadelphia	117,000
14. The Texas Co., Westville	80,000
15. The Texas Co., Claymont	3,500
16. Socony-Vacuum Oil Co., Paulsboro	59,000
17. Gulf Oil Corp., Philadelphia	107,000
18. Amer. Bit. & Asph. Co., Baltimore	7,000
19. Esso Standard Oil Co., Baltimore	55,000
20. Pan American Ref. Corp., Baltimore	6,500
Total	804,000
SOUTH CAROLINA AND GEORGIA:	
21. Esso Standard Oil Co., Charleston	7,500
22. Mexican Pet. Corp. of Ga., Savannah	5,800
Total	13,300
WESTERN N. Y. AND NORTH CENTRAL PA.:	
23. Frontier Oil Ref. Co., Tonawanda	20,000
24. Socony-Vacuum Oil Co., Buffalo	24,000
25. Socony-Vacuum Oil Co., Olean	7,000
26. Sinclair Ref. Co., Wellsville	9,000
27. Kendall Ref. Co., Bradford	5,000
28. Quaker State, Farmers Valley	4,000
Total	69,000
WESTERN PENNSYLVANIA:	
29. Pennzoil Co., Rouseville	6,500
30. United Ref. Co., Warren	5,000
31. L. Sonneborn Sons, Inc., Franklin	2,000
32. Wolf's Head, Reno	2,500
33. Quaker State, Emlenton	2,000
34. Sonneborn, L., & Sons, Petrolia	4,000
35. Quaker State, Oil City	2,500
36. Cities Service Oil Co., Titusville	3,000
37. Pennsylvania Ref. Co., Karns City	1,400
38. Freedom-Valvoline Co., Freedom	4,000
39. Gulf Oil Corp., Neville Island	15,000
Total	48,100
WEST VIRGINIA:	
40. Quaker State, St. Mary's	2,500
41. Elk Ref. Co., Falling Rock	6,500
42. Pure Oil Co., Cabin Creek	5,500
Total	13,500
Total District 1	1,291,500

PAD DISTRICT 2

Company and location—	Crude oil cap., bbl. per day
WISCONSIN AND MINNESOTA:	
43. Northwn Ref. Co., New Brighton	5,000
44. Northwn Ref. Co., St. Paul Park	5,000
45. Wisconsin Oil Ref. Co., Sheboygan	5,000
46. Lake Superior Ref. Co., Superior	4,000
Total	19,000
CENTRAL MICHIGAN:	
47. Producers Ref., West Branch	2,500
48. Osceola Ref. Co., Reed City	2,000
49. Roosevelt O. & R. Co., Mt. Pleasant	7,500
50. Naph-Sol Ref. Co., No. Muskegon	2,500
51. Old Dutch Ref. Co., Muskegon	12,500
52. Leonard Refineries, Inc., Alma	10,000
53. Mid-West Refineries, Inc., Alma	10,000
54. Bay Ref. Corp., Bay City	10,500
55. Pure Oil Co., Midland	4,700
56. Shamrock Oil & Ref. Co., Saginaw	*3,500
57. Lakeside Ref. Co., Kalamazoo	2,300
58. Crystal Ref. Co., Carson City	2,300
59. Marvel Ref. Co., Grand Rapids	2,000
60. Aurora Gasoline Co., Elsie	3,700
Total	93,000
DETROIT-TOLEDO-LIMA AREA (Ohio and Mich.):	
61. Aurora Gasoline Co., Detroit	23,000
62. Socony-Vacuum Oil Co., Trenton	23,000
63. Petroleum Specialties, Flat Rock	6,500
64. Gulf Ref. Co., Toledo	40,000

Company and location—	Crude oil cap., bbl. per day
65. Pure Oil Co., Toledo	29,400
66. Standard Oil Co. (Ohio), Toledo	21,000
67. Sun Oil Co., Toledo	45,000
68. Deweese Oil Refinery, Weston	500
69. Ashland O. & R. Co., Findlay	9,500
70. Standard Oil Co. (Ohio), Lima	20,000
Total	205,900
CENTRAL AND N. E. OHIO:	
71. Standard Oil Co. (Ohio), Cleveland	42,500
72. Western Reserve Ref. Co., Niles	2,300
73. Ashland Oil & Ref. Co., Canton	12,000
74. Pure Oil Co., Heath (Newark)	15,500
Total	72,300
CHICAGO AREA (Ill. and Ind.):	
75. Globe O. & R. Co., Lemont	27,000
76. Pelco Corp., Blue Island	20,000
77. Texas Co., Lockport	65,000
78. Calumet Ref. Co., Burnham	1,300
79. Standard Oil Co. (Ind.), Whiting	260,000
Ill. Sinclair Ref. Co., East Chicago	105,000
81. Johnson Oil Supply Corp., Gary	2,500
82. Cities Service Oil Co., E. Chicago	35,000
83. Soc.-Vac. Oil Co., Inc., E. Chicago	25,000
Total	630,700
WOOD RIVER AREA (Ill.):	
84. Henry H. Cross Co., Colmar	200
85. Ebell Oil Co., Wood River	130,000
86. Standard Oil Co. (Ind.), Wood River	48,000
87. Sinclair Ref. Co., Hartford	25,000
88. Socony-Vacuum Oil Co., E. St. Louis	30,000
89. Dupo Oil Ref. Co., Dupo	*1,000
Total	233,200
S. E. ILL., S. IND., S. W. OHIO, N. CENTRAL KY.:	
90. Pana Ref. Co., Pana	4,425
91. Rock Island Ref. Corp., Rock Island	12,000
92. Ashland O. & R. Co., St. Elmo	3,500
93. Ohio Oil Co., Robinson	30,000
94. Harmony Oil Corp., Salem	*4,000
95. Texas Co., Lawrenceville	67,000
96. R. J. Oil & Ref. Co., Princeton	5,000
97. Advance Ref. Co., Centralia	2,300
98. Arrow Petroleum Co., Centralia	*4,500
99. Troy Ref. Co., Troy	1,450
100. Sol-Tex Ref. Co., Fairfield	*2,500
101. Ind. Farm Bur. Co-Op., Mt. Vernon	10,000
102. Gulf Ref. Co., Cleves	30,000
103. Aetna Oil Co., Louisville	11,000
104. Louisville Ref. Co., Louisville	6,000
105. Stoll Oil Ref. Co., Louisville	2,000
106. Standard Oil Co. (Ohio), Latonia	10,500
Total	193,650
E. KENTUCKY AND TENNESSEE:	
107. Ash. O. & R. (Pin. I & 2), Catlettsburg	43,000
108. Somerset Refinery, Somerset	2,000
109. Southern Oil Service, Nashville	1,000
110. Delta Refining Co., Memphis	6,000
Total	52,000
WESTERN NEBRASKA:	
111. Sioux Oil Co., Chadron	700
112. Coop. Refinery Assn., Scotts Bluff	2,200
113. Porter Oil Co., Sidney	*300
Total	3,200
KANS., MO., AND E. NEB.:	
114. Searle Pet. Co., Omaha	2,000
115. Mid-States Ref. Co., Falls City	6,000
116. Coop. Ref. Assoc., Phillipsburg	4,300
117. Phillips Oil Co., Kansas City	40,000
118. Standard Oil Co. (Ind.), Sugar Creek	20,000
119. Shallow Water Ref. Co., Shal. Water	4,000
120. Bay Pet. Corp., McPherson	5,000
121. Mail. Coop. Ref. Assn., McPherson	33,000
122. Vickers Petroleum Co., Potwin	5,500
123. Sarsco Oil Co., Wichita	6,000
124. Derby Oil Co., Wichita	12,000
125. El Dorado Ref. Co., El Dorado	9,500
126. Skelly Oil Co., El Dorado	60,000
127. Chanute Ref. Co., Chanute	*1,000
128. Mc. F. Oil Co., Chanute	2,000
129. Socony-Vacuum Oil Co., Augusta	27,000
130. Standard Oil Co. (Ind.), Neodesha	19,700
131. Kanotex Ref. Co., Arkansas City	12,000
132. Coop. Ref. Assoc., Coffeyville	23,000
Total	301,900
OKLAHOMA:	
133. Cities Service, Ponca City	30,000
134. Continental Oil Co., Ponca City	55,500
135. Champlin Ref. Co., Enid	20,000
136. Johnson Ref. Co., Cleveland	5,000
137. The Texas Co., Tulsa	35,000
138. Mid-Continent Pet. Corp., Tulsa	55,000
139. Deep Rock Oil Corp., Cushing	10,000
140. Midland Coop. Wholesale, Cushing	5,500
141. Tide Water Assoc. Oil Co., Drumright	15,000
142. Wilcox Oil Co., Bristow	5,500

Company and location—	Crude oil cap., bbl. per day
143. Allied Materials Corp., Stroud	2,000
144. Phillips Oil Co., Okmulgee	13,000
145. Mercury Oil Ref. Co., Okla. City	5,000
146. Monarch Ref., Inc., Okla. City	1,000
147. Peppers Ref. Co., Okla. City	1,500
148. Harper & Turner Oil Co., Edmond	*2,000
149. Sunray Oil Corp., Allen	10,000
150. Anderson-Prichard Oil Corp., Cyril	10,000
151. Sunray Oil Corp., Duncan	10,000
152. Kerr-McGee Oil Ind., Wynnewood	10,000
153. Boll Oil & Gas Co., Grandfield	7,000
154. Ben Franklin Ref. Co., Ardmore	7,500
Total	104,000
SOUTH DAKOTA:	
155. New Kota Ref. Co., Sturgis	120
156. Rex Oil Ref. Co., Rapid City	*200
157. Hot Springs Ref. Co., Hot Springs	230
Total	550
Total District 2	2,047,990

PAD DISTRICT 3

Company and location—	Crude oil cap., bbl. per day
ALABAMA AND MISSISSIPPI:	
158. Paluxy Asphalt Co., Crupp	3,500
159. Southland Co., Sanderville	4,500
160. Hunt Oil Co., Tuscaloosa	8,000
161. American Bit. & Asph. Co., Mobile	1,000
Total	17,000
ARKANSAS:	
162. Berry Asphalt Co., Waterloo	1,000
163. Henry H. Cross Co., Smackover	4,000
164. Berry Asphalt Co., Stephens	1,500
165. MacMillan Pet. Corp., Norphlet	4,000
166. Lion Oil Co., El Dorado	22,000
167. Pan-Am. South. Corp., El Dorado	32,000
Total	84,500
NORTHWESTERN LOUISIANA:	
168. Stanolind Oil & Gas Co., Superior	5,350
169. Bayou State Oil Corp., Homer	1,000
170. Coast Oil Co., Cotton Valley	*3,000
171. Premier Oil Ref. Co., Cotton Valley	*3,000
172. Calumet Ref. Co., Princeton	700
Total	17,350
SOUTHEASTERN LOUISIANA:	
173. Esso Standard Oil Co., Baton Rouge	245,000
174. Shell Oil Co., Norco	50,000
175. Pan-Am South. Corp., Destrehan	30,000
176. Bay Petroleum Corp., Chalmette	16,000
177. Petco Corp., Marrero	3,000
178. Gilcrease Oil Co., Meraux	5,000
179. Canal Ref. Co., Church Point	1,700
Total	353,700
LAKE CHARLES-BEAUMONT-HOUSTON (La. & Tex.):	
180. Evangeline Ref. Co., Jennings	1,250
181. Cities Service Ref., Lake Charles	150,000
183. Continental Oil Co., Lake Charles	11,000
185. Inland Ref. Co., Palestine	2,000
186. Pure Oil Co., Nederland	55,000
187. Magnolia Petroleum Co., Beaumont	175,000
188. The Texas Co., Port Neches	40,000
189. Oil Chemical, Galena Park	5,000
190. Humble Oil & Ref. Co., Baytown	280,000
191. Gulf Oil Corp., Port Arthur	245,000
192. Atlantic Ref. Corp., Port Arthur	56,000
193. The Texas Co., Port Arthur	200,000
194. Crown Central Pet. Corp., Houston	25,000
195. Eastern States Pet. Co., Houston	40,000
196. Eddy Ref. Co., Houston	2,500
197. Shell Oil Co., Houston	115,000
198. Sinclair Ref. Co., Houston	90,000
199. Pan-Am Ref. Corp., Texas City	130,000
200. Texas City Ref. Co., Texas City	60,000
201. Republic Oil Ref. Co., Texas City	40,000
202. Sid Richardson Ref. Co., Texas City	25,000
203. Hamman Oil & Ref. Co., Bay City	*2,000
204. Phillips Oil Co., Sweeny	97,000
Total	1,839,750
CORPUS CHRISTI AND S. W. TEXAS:	
205. Monarch Ref. Co., San Antonio	1,200
206. Three Rivers Ref., Three Rivers	1,500
207. Danaho Ref. Co., Pettus	4,000
208. Pontiac Ref. Corp., Corpus Christi	20,000
209. Sinclair Ref. Co., Corpus Christi	20,000
210. Southwest. O. & R., Corpus Christi	30,000
211. Taylor Ref. Co., Corpus Christi	47,000
212. W. C. McBride Co., Bishop	*2,000
213. McBride Ref. Co., La Blanca	2,500
214. Rado Ref. Co., McAllen	2,750
215. Mex-Tex Oil Co., Rio Grande City	750
216. Taylor Ref., Inc., Port Isabel	12,000
217. Port Fuel Co., Brownsville	4,000
Total	194,150
EAST TEXAS:	
218. Amer. Liberty Oil Co., Winnsboro	2,200
219. Amer. Liberty Oil Co., Mt. Pleasant	14,000

ATES---THEIR LOCATIONS AND CAPACITIES

IL AND GAS JOURNAL STATISTICAL DEPARTMENT

Company and location—	Crude oil cap., bbl. per day
218. Roger Lacy, Inc., Big Sandy	3,000
219. McMurrey Pet. Corp., Tyler	10,000
220. Peerless Tank Cleaning Co., Kilgore	1,000
221. Premier Pet. Co., Longview	4,000
222. Petrolite Corp., Kilgore	700
223. Shelly Oil Co., Longview	6,000
224. Gladewater Ref. Co., Gladewater	2,500
225. Premier Pet. Co., Arp	5,000
226. Dodds Ref. Co., Inc., Jacksonville	*1,000
227. Alba Ref. Corp., Alba	*1,500
Total	53,000
NORTH CENTRAL TEXAS:	
228. Waggoner, W. T. Estate, Electra	5,000
229. Lasalle Pet. Corp., Bunkburnett	*1,500
230. Continental Oil Co., Wichita Falls	7,000
231. Panhandle P.&R. Co., Wichita Falls	9,000
232. Mountain Ref. Co., Wanette	*700
233. Tydal Co., Gainesville	1,000
234. Bryson P. L. & R. Co., Bryson	*1,200
235. Gulf Oil Corp., Fort Worth	8,500
236. Magnolia Pet. Co., Fort Worth	12,000
237. Premier Pet. Co., Fort Worth	4,500
238. Ute Oil & Ref. Co., Graham	850
239. Baird Refining Co., Baird	2,500
240. Premier Pet. Co., Baird	2,500
Total	58,900
TEXAS PANHANDLE:	
241. Shamrock O. & G. Corp., Sunray	10,000
242. Phillips Oil Co., Phillips	70,000
243. The Texas Co., Amarillo	9,500
Total	89,500
W. TEXAS & S. E. NEW MEXICO:	
244. Consumers Coop. Ref., Levelland	5,000
245. Wickett Ref. Co., Wickett	3,000
246. Reischman, R. J., Ft. Stockton	*200
247. Onyx Ref. Co., Abilene	6,000
248. Patton Oil Co., Roxan	1,500
249. Gulf Oil Corp., Sweetwater	9,000
250. Cosden Pet. Corp., Big Spring	34,000
251. Col-Tex Ref. Co., Colorado City	6,745
252. Pet. Products R. & P. Co., Loraders	1,500
253. Mabee Refineries, Inc., Roswell	2,500
254. New Mexico A. & R. Co., Artesia	7,500
255. Continental Oil Co., Artesia	5,400
256. Famarins Oil & Ref. Co., Monument	1,200
257. McNutt Oil & Ref. Co., Brickland	3,000
258. Standard Oil Co. (Texas), El Paso	10,000
259. The Texas Co., El Paso	9,500
Total	99,045
N. W. NEW MEXICO:	
260. Continental Oil Co., Farmington	750
261. The Kaiser Co., Bloomfield	200
262. Pet. Products R. & P. Co., Prewett	1,500
Total	2,450
Total, District 3	2,733,195

PAD DISTRICT 4

Company and location—	Crude oil cap., bbl. per day
MONTANA:	
263. The Texas Co., Sunburst	7,500
264. Union Oil Co. of Calif., Cut Bank	3,000
265. Big West Oil Co. of Mont., Kevin	2,000
266. Unity Pet. Corp., Kalispell	1,000
267. North Star Ref. Co., Shelby	1,500
268. Phillips Pet. Co., Great Falls	2,000
269. Hart Refineries, Missoula	800
270. Hunt, Eugene, Winnett	*300
271. Carter Oil Co., Billings	22,000
272. Continental Oil Co., Billings	6,000
273. Solar Oil & Ref. Co., Hardin	*1,500
274. Farmers Union Cent. Ex., Laurel	12,000
Total	61,600
WYOMING:	
275. Resolute Oil Corp., Badger Basin	1,000
276. Ohio Oil Co., Lovell	8,000
277. Husky Ref. Co., Cody	3,000
278. Empire St. Oil Co., Thermopolis	5,000
279. Pilot Oil Co., Minton	200
280. Creek Co. Ref. Co., Sundance	*125
281. Coop. Ref. Assn., Newcastle	1,750
282. Sinclair Oil Co., Newcastle	2,500
283. Socony-Vacuum Oil Co., Inc., Casper	9,500
284. Standard Oil Co. (Ind.), Casper	17,300
285. The Texas Co., Casper	15,000
286. Continental Oil Co., Clearcreek	3,000
287. C. & H. Refinery, Lusk	160
288. Wheatco Ref. Co., Inc., Wheatland	200
289. Sinclair Ref. Co., Sinclair	25,000
290. Frontier Ref. Co., Cheyenne	9,700
291. The Texas Co., Calpet	500
Total	101,335
COLORADO:	
292. Bay Pet. Corp., Denver	11,000
293. Continental Oil Co., Denver	9,500
294. Empire Pet. Co., Denver	5,000
295. Oriental Ref. Co., Denver	5,000
296. Skelly Oil Co., Denver	1,500
297. Oriental Ref. Co., Alamosa	1,100
Total	31,600
UTAH AND IDAHO:	
298. Phillips Petroleum Co., Pocatello	2,500
299. Phillips Pet. Co., Woods Cross	10,000
300. Salt Lake Ref. Co., Salt Lake City	27,000
301. Utah Oil Ref. Co., Salt Lake City	27,000
302. Western St. Ref. Co., N. Salt Lake	2,500
303. Uinta Oil Co., Jensen	1,350
Total	72,350
Total, District 4	267,385

PAD DISTRICT 5

Company and location—	Crude oil cap., bbl. per day
CALIFORNIA:	
San Francisco Bay Area—	
304. Std. Oil of Calif., Richmond	150,000
305. Tide Water Assoc. Oil Co., Avon	85,000
306. Union Oil Co. of Calif., Rodeo	82,000
307. Shell Oil Co., Martinez	45,000
308. Paraffine Cos., Ltd., Emeryville	1,500
Total	353,500
Coastal	
309. Five C Ref. Co., Santa Maria	2,500
310. Sunray Oil Corp., Santa Maria	7,500
311. Western A & R Co., Santa Maria	1,500
312. Bell Pet. Co., Casmalia	3,500
313. Seaside Oil Co., Ventura	4,000
314. Newhall Ref. Co., Newhall	3,500
315. Economy Asphalt Co., Oxnard	2,000
316. Oxnard Oil & Ref. Co., Oxnard	2,500
Total	28,000
San Joaquin Valley	
317. Caminol Co., Hanford	6,000
318. Douglas Oil Co. of Calif., Bakersfield	6,500
319. Golden Bear Oil Co., Bakersfield	3,000
320. Mohawk Pet. Corp., Bakersfield	11,000
321. Paloma Ref. Co., Bakersfield	1,000
322. Sunland Ref. Corp., Bakersfield	6,000
323. Union Oil Co. of Calif., Bakersfield	9,100
324. Standard Oil Co. of Calif., Bakersfield	10,000
325. Norwalk Co., Bakersfield	10,000
326. Norwalk Co., Maricopa	*10,000
327. General Pet. Corp., Lebec	*23,000
Total	103,700
LOS ANGELES BASIN:	
328. Rothschild Oil Co., S. Fee Springs	6,500
329. Rothschild Oil Co., S. Fee Springs	*8,000
330. Eagle Oil & Ref. Co., S. F. Springs	*4,000
331. The Petrol Corp., Los Angeles	*4,500
332. General Pet. Corp., Vernon	4,000
333. Wilshire Oil Co., Inc., Norwalk	23,000
334. Standard Oil Co. of Calif., El Segundo	197,000
335. Triangle Oil & Ref. Co., Venice	2,500
336. Union Oil Co. of Calif., Wilmington	71,000
337. The Texas Co., Los Angeles	80,000
338. Shell Oil Co., Wilmington	53,000
339. Westoil Terminals Co., Wilmington	*34,000
340. Maritime Pet. Corp., Wilmington	*1,000
341. Fletcher Oil Co., Wilmington	(†)
342. McCallen Ref., Huntington Beach	5,000
343. Douglas Oil Co. of Calif., Clearwater	4,000
344. Aromalene, Inc., Long Beach	1,000
345. Eureka Ref. Corp., Long Beach	4,500
346. Century Oil Co., Long Beach	5,000
347. Edgington Oil Ref., Long Beach	3,000
348. Envoy Pet. Co., Long Beach	3,000
349. Havcock Oil Co. of Calif., Lg. Beach	13,500
350. Harbor Ref. Co., Long Beach	*3,000
351. MacMillan Pet. Corp., Long Beach	7,000
352. Olympic Refinery Co., Long Beach	*3,500
353. Richfield Oil Corp., Watson	100,000
354. Tide Water Assoc. Oil Co., Watson	14,000
355. Richfield Oil Corp., Vinvale	*10,000
356. General Pet. Corp., Torrance	125,000
357. Sunset Oil Co., Torrance	10,000
358. Socal O. & R. Co., Huntington Beach	(†)
Total	709,500
Total, California	1,194,600
WASHINGTON AND OREGON:	
359. Phillips Pet. Co., Spokane	5,000
360. Am. Bit. & Asph., Richmond Beach	4,500
361. Union Oil Co. of Calif., Edmonds	4,000
362. American Bit. & Asph. Co., Portland	6,000
Total	19,500
Total, District 5	1,304,300
U. S. total	17,484,380

*Idle plant. †Cracking operations only. ‡Exclusive of plants scheduled to be placed on idle status in 1953. Plants of less than 100 bbl. per day capacity also excluded.

Fig. 5—Thread inspection service.

Fig. 7—Use of external diameter gage.

Fig. 6—Corrosive pitting in used pipe.

Fig. 8—Sonoscope inspection.

as an overlap. The depth of the defect is measured with a dial depth gage. Fig. 2 shows the iron filings outlining a seam 0.045 in. in depth.

The defect in Fig. 3 was caused by a piece of cold metal being rolled into the length of pipe during the milling process. This type defect is commonly known as a roll-in or slug. In this case the defect was in new drill pipe. After approximately 18,000 ft. of active drilling service, the slug had fallen out and a fatigue crack had developed and progressed through the body of the pipe. This type of defect often causes premature failures on a new string of drill pipe.

Mechanical inspection . . . The pipe is given a mechanical-optical inspection internally for mechanical discontinuities. After the pipe has been cleaned full length with a rotary wire brush and air, the internal surface is inspected by looking through the optical instrument as it is moved slowly through the pipe. (See Fig. 4.) In this way all of the internal defects are noted and graded according to their nature and depth. Due to inaccessibility, the depth of all of the internal defects cannot be measured, but a reasonable estimate of the seriousness and extent can be made by this method.

These internal mechanical discontinuities can take the form of open laminations, seams, pits, and splits. Not only can this type defect cause failure, but can restrict the internal diameter, making the running of tools difficult.

The A.P.I. specifications say that "each length of casing shall be capable of being tested throughout its entire length with a cylindrical drift mandrel having a diameter and length as specified." For mill inspection tests, it is necessary to drift each end of the casing only for a short distance. Of course, the main purpose of drifting is to determine the presence of a restricted internal diameter. These restrictions can also take the form of mashes or mill defects which project from the inside wall of the casing. All of these restrictions can be found only by full length drifting.

Thread inspection . . . This service includes inspection of the threads on new tubular goods for depth, lead, and taper, and, when requested, the length of perfect threads, measurement of wall thickness 23 in. from the end, and visual inspection of the outside of the pipe for damage caused by handling. All of these are covered by A.P.I. specifications.

All thread-inspection gages are of special design for oil-country tubular-goods inspection and are periodically returned to the factory for calibration. Some threads do not meet standards because of errors in the threading proc-

Fig. 9—Internal-transverse pitting and fatigue cracks in used drill pipe.

Fig. 10—Magnetizing and pickup units.

ess; others, due to damage after leaving the mill area. The man on the left in Fig. 5 is checking the thread on the field end on the casing for lead; the other man is checking taper. The rest of the instruments and case are shown in the background.

All lengths of new pipe inspected are classified into four groups; that is, lengths having no defects, lengths having defects not exceeding A.P.I. specifications, lengths having defects of undetermined depth, and lengths having defects exceeding A.P.I. specifications. For identification, a different color paint is used on each of these four groups. Also each defective length has the defect clearly marked with its depth, if determined, and a code number for future identification.

A detailed report is made upon completion of the job, giving complete information concerning number of good lengths, and type, depth, and size of defect on defective lengths.

Any or all of the previously discussed services can be used to inspect new tubular goods. Usually a combination of the services will be selected to fill the customer's needs. That is, magnetic inspection, mechanical-optical inspection, drifting and thread inspection.

In these days of pipe shortages, higher pressures, deeper production, and use of foreign and conversion pipe, inspection of new tubular goods is more important than ever before.

In the last 4½ years in over 13 million feet of new pipe inspection, the Tuboscope company has found approximately 3 per cent of all new pipe not meeting A.P.I. specifications. It has long been realized that the proper place for the pipe to be given a complete inspection is in the mill itself, rather than the field. Due to production schedules in the mill, a detailed inspection is impractical. In the short time allotted and with the tools used, the mill inspection departments do an excellent job. Our company has gone so far as to demonstrate in the mills some equipment which has possibilities of doing an even better job of inspection and still keep up with the production.

Used Tubular Goods

Inspection of used tubular goods presents far more problems than new pipe inspection. Of course, there are no complete A.P.I. specifications for standards on this type work. Some new pipe specifications, along with experience and knowledge of local conditions, are used to salvage all the usable pipe from a used string. For a good inspection, not only is it helpful for the inspector to know where and how pipe is to be used, but knowledge as to previous use is also of great importance. Knowledge as to area, depth, pressures, and trouble previously occurring in the pipe may make a difference in the way it is inspected.

Mechanical-optical inspection is used

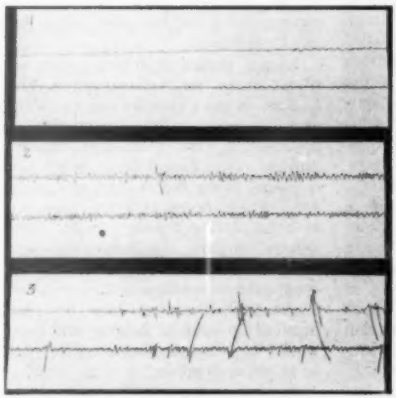


Fig. 11—Typical Sonoscope recordings.

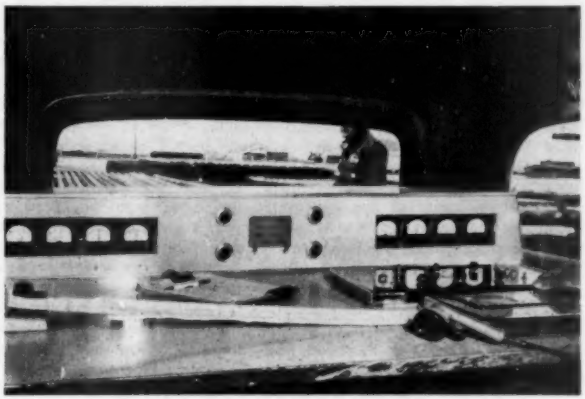


Fig. 12—Interior of Sonoscope cab showing recording device.

on the internal surface to determine the presence of cutter marks, corrosive pitting, rod wear, and mill defects. With the aid of a contour depth gage, attached to the mechanical-optical instrument, the depths of many of these internal defects can be measured. These internal defects are graded in regard to their nature and depth (see Fig. 6). Specifications in relation to percentages of body-wall thickness are determined by use of the pipe. Thread inspection and drifting can also be added to complete the inspection.

The equipment used to inspect used drill pipe is much more complicated than the previously discussed equipment. An external diameter gage, a mechanical - optical instrument, and Sonoscope are used for a complete inspection.

The external diameter gage is used to determine the amount of body-wall reduction. The change in outside diameter is measured while the pipe is rolled to determine the amount of abrasive wear. (See Fig. 7.) To do this a man must gage the full length of the pipe and also grade the general condition regarding dangerous stress-concentrating defects. These defects can take the form of external pitting, mashes, tong marks, slip cuts, rubber ring grooves, and slip area elongation. As the pipe is gaged it is classified as to body-wall reduction and other defects.

Sonoscope inspection, which at the present is used exclusively on used drill pipe, has been well accepted in the oil fields. It is accurate and the chance of human error is minimized during the inspection procedure. The method has been in use for about 3 years and has been developed through practical experience and engineering to a point where it is practically infallible. As an instrument for detecting and analyzing localized areas of fatigue, the Sonoscope is foolproof and easy to interpret.

Any nondestructive testing method requires an application of energy in which the test piece is allowed to deform and a method of observing the induced deformity of a portion of the input test force. The test force used by Sonoscope consists of a compounding of direct-current magnetization of sufficient amplitude to approach saturation of the test piece with an alternating current field, which is superimposed upon the test piece, to induce vibration. Both of these forces are applied to the specimen by magnetic induction. The surface of the sample is then probed for both magnetic flux emanations from the specimen and for changes in density of the flux input. The pickup unit is designed to assure optimum signal generation from fatigue-induced defects and the other defects most detrimental to drill pipe.

This method of inspection detects internal and external mechanical and structural flaws. The pickup unit is moved down the pipe at a constant and predetermined speed to record the condition of the pipe. The information from the pickup unit is transferred to a recording device which makes a log of the pipe's condition. In turn the operator interprets the information on the chart and correlates it with the external gage reading to arrive at the final classification of the body of the pipe.

Fig. 8 details a complete Sonoscope operation, showing approximately the rack space required.

Fig. 9 shows a typical used drill pipe, containing internal transverse pitting and fatigue cracks.

Fig. 10 shows the magnetizing and pickup units in position to start inspection of the pipe. The electric jacks are used to suspend the pipe from the tool joints. The iron filings in the powder bulb are used to check the external surface in the upset and tool joint area for cracks. The hammer and punch are used to center punch the final identification on the face of the pin for permanent identification.

Each length of pipe is marked with consecutive numbers with a metal stencil on the upset on the pin end, behind the tool joint. A corresponding number is marked on the Sonoscope tape. These tapes are filed so that should a need arise to check back on a length, they can be easily located and analyzed.

From the characteristics and size of the indication on the chart, the operator can tell the nature of the defect and whether it is internal or external.

Inspection results . . . The picture in Fig. 11 shows typical recordings found in the inspection of West Texas used drill pipe. Chart 1 shows indications of very few discontinuities and if the body of the pipe were not undergage, would be classed as No. 2 pipe.

Chart 2 shows indications of internal pitting affecting the body wall. Because of most of this pitting the length of pipe would be classed as No. 3 pipe, if not for the sharp indication of the upper line. This sharp pulse indicates either a small internal fatigue crack or incipient fatigue in the pitting. In checking the pipe at this point no crack was found, but because of the incipient fatigue condition the pipe was classed as No. 4.

Chart 3 shows minor pitting and many internal fatigue cracks. All of these cracks started from the internal surface and have progressed from 10 per cent on the smaller indication, to 50 per cent on the larger indications of the body-wall thickness. These indications are checked with the mechanical-optical instrument on the internal surface or, if necessary, a localized internal magnetic inspection can be performed.

Magnetic inspection on the external surface is performed to confirm the presence of these cracks. It has been found that fatigue cracks do develop any place in a length of pipe from tool joint to tool joint; therefore, since the Sonoscope runs only from upset to upset, another inspection is made of the pipe to determine the presence of last engaged thread failures, fluid washes, or cracks in the upset area and inside of the tool joints. This is done by cleaning the tool joint and upset area on each end and examining this area with mechanical-optical instrument.

Three classifications are used in the inspection of used drill pipe in the Permian basin, Nos. 2, 3, and 4.

No. 2 is the best grade. It will meet these conditions: there will be no cuts, mashes, or abrasive wear affecting over 15 per cent of the body wall. There may be minor pitting, but none of such a nature as to cause direct failure. This class is recommended for any drilling service and any tool joint repair or replacement necessary.

Class No. 3 is a restricted class which may contain moderate pitting, abrasive wear of 15-25 per cent, small cuts or mashes, or a correlation of these conditions, indicating that 15-25 per cent of the body-wall thickness has been damaged. It is recommended that this group of pipe be restricted in use. It can usually be used satisfactorily by limiting it to shallow drilling service or top hole pipe. This class is recommended for tool-joint repair, but not replacement.

Several groups of defective pipe are placed in the No. 4 classification. This is done so the customer can easily tell why his pipe is causing trouble or possibly use some of the pipe for some purpose other than drilling. Some pipe is placed in the No. 4 class due to defects which come into the pipe due to abuse during drilling service. These defects include slip cuts, slip area elongation, stretched pipe, rubber ring grooves, cuts, mashes, and tong marks. These external defects are very susceptible to notch fatigue and care should be taken to minimize this group as much as possible.

Another group includes internal and external fatigue cracks which occur due

to pipe being subjected to high drilling stresses. These external cracks usually start in the bottom of an external stress-concentrating defect, that is, at some mechanical or structural change in the metal. The internal cracks usually start in corroded areas or other discontinuities in the metal.

Several more groups are included in the No. 4 class which are excessive corrosive pitting internally, excessive abrasive wear externally, or a correlation of these conditions. No. 4 pipe is not recommended for further drilling service.

Identification . . . Each length of drill pipe is clearly identified by paint and center-punch marks on the pin end corresponding to its final classification. Any obviously defective tool joints are identified so they can be repaired before the pipe is returned to service. If the customer so desires, a complete inspection of tool joints can be given at the time the length of pipe is inspected. This includes magnetic inspection of the threads, visual inspection for washes or galled threads, and a calipering of the outside diameter if desired.

Fig. 12 shows the inside of the Tuboscope cab where the condition of the pipe is recorded. From here the chief inspector controls the complete inspection procedure.

During the 6 months ended November 30, 1951, in the Permian basin, Sonoscope crews inspected approximately 1 million feet of active drill pipe, during which time a total of only three premature failures were reported to us subsequent to inspection. One of these failures was definitely traced to misinterpretation of pipe identification marks by the drilling crew.

Such a record could not have been achieved without discarding some pipe from which further service could have been realized. This is true partly because in grading of used drill pipe the operator is faced with decisions between shades of gray rather than black and white, or good and bad pipe. The most important factor responsible for this, however, is the fact that the inspector knows he has no control over the work loading to which the pipe will be subjected after inspection.

Improved operations . . . It has been found by setting up and properly using an inspection program on used drill pipe that some contractors have reduced fishing jobs as much as 90 per cent over a 12-month period, while at the same time extending the life of a string as much as 100 per cent. Knowledge of the drilling techniques used by one operator is helpful in determining rejection limits, but one driller trying to make up for lost time or a lost hole can overstress a string of pipe in a very short time, to the point that fatigue cracks will appear in a borderline length left in a string, or even a good length. Most operators realize this and prefer to discard some pipe with part of its work life unused, rather than instigate a policy of obtaining all the pipe which has not reached a fatigue state and take a chance on premature failures.

Making Premium-Grade Motor Fuel

(*Continued from page 87*)

bottom of the stabilizer is subjected to a number of tests, among which are the following: Reid vapor pressure; A.S.T.M. distillation; A.P.I. gravity; octane numbers, both clear and leaded, by research and motor method; corrosion by the copper-strip test; and stability by copper-dish and oxygen-bomb methods.

The recycle gas is analyzed intermittently to determine the amount of hydrogen sulfide. The Tutweiler method is used and is especially applicable when a charge stock of very high sulfur content is being run to the Platforming unit. The A.S.T.M. test for aromatic content in petroleum distillates is performed on the reactor charge and on stabilized platformate samples. Aromatic content of the platformate varies from 35 to 45 per cent.

Instrumentation . . . Each of the three heating coils in the three-cell furnace is temperature controlled. Temperature measurements are made with continuous-balance electronic potentiometers. For metering and flow control excellent results have been obtained with differential-pressure diaphragm type flow transmitting cells.

Rotameters are used to determine the flow rate of light oil from the thermal cracking unit and for measuring the intermediate reflux to the prefractionator.

TABLE 1 — PLATFORMING UNIT OPERATING RESULTS

Period	1	2
Reactor charge, bbl. per day	1,980	1,840
Platformate yield, volume per cent of charge	93	90.6
Inspection:		
Platformate		
Octane numbers F-1 clear	80.6	84.1
Plus 3 cc. TEL	93.4	95.5
°A.P.I.	54.7	54.0
R.v.p.	7.2	7.7
I.b.p.	99	95
10 per cent	157	157
50 per cent	255	258
90 per cent	330	340
End point	397	402
Reactor charge		
Octane numbers F-1 clear	45.6	45
Plus 3 cc. TEL	66.5	65
°A.P.I.	56	55
R.v.p.	1.5	
I.b.p.	174	182
10 per cent	218	231
50 per cent	279	283
90 per cent	335	342
End point	370	380

Operating results . . . Inspections made currently on reactor charge and Platforming product are given in Table 1. After the first 10 months of Platformer operation, Johnson Oil Refining Co. has found that it can upgrade 1,840 bbl. of 40 to 45-octane number material to 80-octane number clear and a 93-octane number with 3 cc. of TEL, at a yield of 92.5 per cent or a 95 plus octane with a yield of at least 90 per cent.

Although the catalyst cost is very high per pound, the cost per barrel is relatively low. The cost, after 10 months of operation, is between 5 and 6 cents per barrel throughput and to date there has been no appreciable loss in catalyst activity.

The operation is simple, smooth, and trouble free and requires only one man shift for its operation. Since the unit first went on stream in June 1951, it has not been shut down. Temporary interruptions of production have been due to power failure, necessity for removing scale from the condensers, and in order to inspect the prefractionator equipment. These temporary interruptions have not caused any particular problems or any decrease in catalyst activity.

Experience with catalytically reformed gasoline made by the Platforming process shows it to be a balanced gasoline which contains the proper hydrocarbons both for low-speed and high-speed performance without knocking. It is an inherently stable type of gasoline and is composed primarily of isoparaffin and aromatic hydrocarbons and contains no olefins so that it does not need rerunning or treating. This product has an induction period running between 1,100 and 1,200 minutes and a 5-hour accumulated gum content of less than 1 mg. per 100 ml. It will not form gum nor deteriorate in storage.

The platformate has a very good response to the addition of tetraethyl lead. It compares favorably with straightrun gasoline in this respect. With 3 cc. of lead the octane can be increased from 10 to 16-octane numbers. This lead response is much greater than that of products made by other processes such as catalytic cracking, thermal cracking, or polymerization.

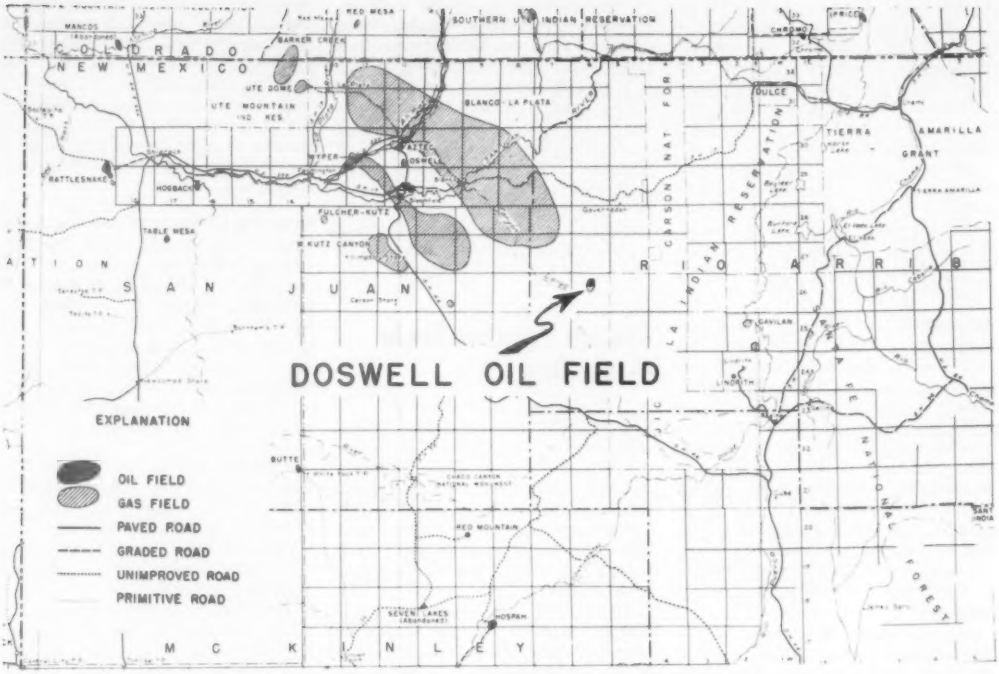


Fig. 1—Map showing geographical location of Doswell field and other oil and gas fields of the region.

Doswell Discovery Enhances Oil Possibilities Of the San Juan Basin . . .

. . . New attention fastened on hitherto unheralded Tocito sandstone, discovery formation

by O. J. Lilly

DOSWELL oil field lies in the approximate center of the San Juan basin in the northern portion of T 26n, R 6w, Rio Arriba County, New Mexico. It is located on mesas of Wasatch sandstone, approximately 42 miles southeast of Farmington, N. M. (See Fig. 1.) The field has two producing oil wells owned and controlled by eastern capital and operated by Lowry et al.

The field was discovered by the late Thomas W. Doswell and the late Todd M. Pettigrew, after they acquired approximately 12,000 acres of federal and state leases in the area. The discovery well, Doswell - Pettigrew 2 Scott-Federal, NW SE 9-26n-6w, was completed in July 1951. It was drilled to a total depth of 6,685 ft. through the Tocito sandstone and completed for an initial production of 404 bbl. of oil daily, flowing through 12/64-in. choke. The oil pay from 6,622-38 ft. has a bottom-hole pressure of 2,200 psi. The oil is deep green in color and is 50.2°-gravity corrected.

Exploration Before Discovery

Prior to the discovery, two noncommercial wells were drilled into the Morrison formation. The first test, Doswell et al 1 Scott-Federal, NE NW 10-26n-6w, 1 mile north and east of the discovery well, found favorable porosity and oil staining in the Tocito sandstone; however, only gas was recovered on the drill-stem test. It is now apparent that the oil was mudded off while the operators waited 72 hours for the testing tool. The test was drilled on through the Dakota and into the Morrison formation. Favorable showings were logged in the Dakota and Morrison formations, but the operators were unable to complete the test for a commercial producer.

The Tocito sandstone was very poorly developed in the second test drilled, the Doswell-Pettigrew 1 State, SE NE 10-26n-6w. The sandstone was very thin, tight, and shaly, and on the drill-stem test only gas-cut mud was recovered. The well was drilled into the Morrison formation had oil and gas showings, but the operators were unable to complete this test for a commercial producer in the Dakota formation due to mechanical difficulties after shot.

Development of Field

Lowry et al 4-13-132 Federal, NE NE 9-26n-6w, was drilled in October 1951 and completed for 200 bbl. of oil daily, flowing through 24/64-in. choke from 6,676-6,716 ft. The low initial production may possibly be

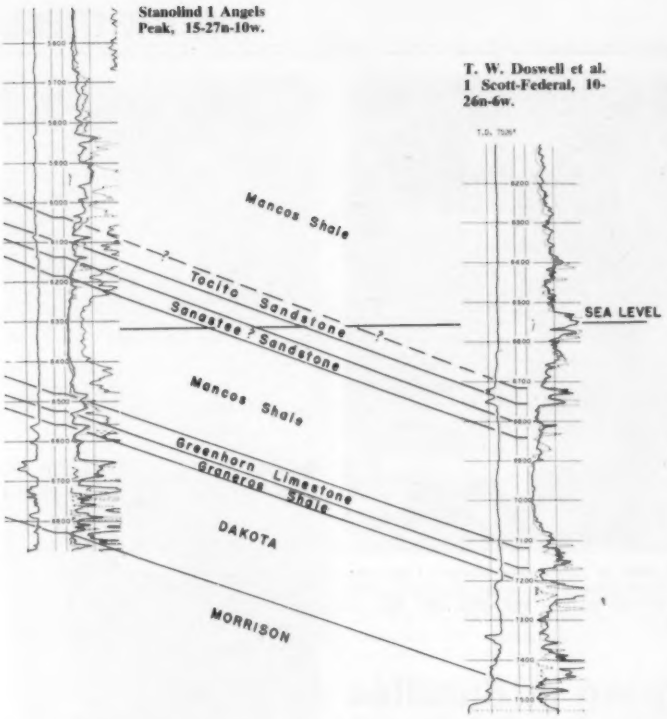


Fig. 2—Correlation to show general stratigraphy of the Tocito and underlying formations penetrated.

accounted for by lost circulation while coring. This well is 46 ft. lower structurally on the top of the Tocito sandstone than the discovery well. Doswell et al 1 Scott-Federal was re-entered and is now being reworked in an effort to obtain production from the Tocito sandstone. Eight Pictured Cliff gas wells have been completed in the field, and locations have been made for additional wells to the Tocito sandstone.

Structure.—Doswell oil field probably represents a stratigraphic trap with no apparent structural uplift where sand conditions are the determining factor for oil accumulation. However, additional wells to the Tocito sandstone may indicate the presence of a structural trap. A structural map of the field, contoured on the top of the Pictured Cliffs sandstone does not indicate structure, nor do limited subsurface data on the Tocito sandstone. From data at hand there is no apparent thickening or thinning of the section from the top of the Pictured Cliffs sandstone to the top of the Tocito sandstone.

The productive sand.—The producing formation, the Tocito sandstone, lentil of the Mancos formation of Upper Cretaceous age, has been correlated with the Gallup sandstone tongue of the lower Mesaverde formation by William S. Pike, Jr., in G.S.A. Memoir 24, 1947.

Samples and cores of the Tocito sandstone are fine to medium grained, slightly angular to subangular, clear quartz sand, with few rounded pebbles and small subrounded black chert fragments. The sand is glauconitic and slightly pyritic. The productive sand contains interbedded sandy shale varying from a few inches to a few feet in thickness. Core analysis on the Lowry et al 4-13-132 Federal indicates porosity of the sand to vary from 5 to 20 per cent, and the permeability from 2 to 622 md. The porosity averages 15.1 per cent, and the permeability averages 138 md. The Tocito sandstone, approximately 40 ft. thick, has an effective pay of approximately 20 ft.

Using interpretative data from electric and Microlog curves, one can evaluate the oil producing zone and make estimates of porosity and oil saturation comparable to core analysis.

Drilling and completion.—It has been the practice to cement approximately 450 ft. of surface casing to protect the potable water, drill through the Tocito sandstone with rotary tools using a low-water-loss mud and to cement the 7-in. producing string at the top of the pay zone. Some lost circulation is experienced in the Lewis shale, the Menafee member of the Mesaverde formation, and the Tocito sandstone. After drilling the plug on the producing string, 2½-in. tubing is run, the mud is displaced with oil, and the well swabbed in.

Production.—Daily average production from the Doswell-Pettigrew 2 Scott-Federal from July 1951 to January 1, 1952, was 390 bbl. of oil, and the Lowry et al 4-13-132 Federal, the second producer, has averaged 186 bbl. of oil daily. Accumulative oil production for the field to January 1, 1952, was 64,054 bbl. To date, the producing wells have shown no water.

Oil is purchased by Petroleum Products & Refining Co. at $2.76 per barrel and is being trucked from the lease to Hospah pool and pumped to its refinery at Prewitt, N. M. A pipe line to the field is contemplated when production reaches 1,000 bbl. of oil daily.

Conclusion

The possibilities of finding other oil fields in the Tocito sandstone are highly likely since favorable oil and gas showings have been found in that zone in Kutz Canyon and West Kutz Canyon gas fields and also at Stoney Butte. It is known that the Tocito sandstone thickens in a westerly and southwesterly direction from Doswell oil field, and this vast area may prove to be the largest oil and gas producing horizon in the San Juan basin.

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Acknowledgments

For constructive help I am indebted to Jack Cooper, district geologist, Continental Oil Co., Durango, Colo.; A. A. Hunt, superintendent, Lowry, et al, Albuquerque, N. M.; John Spragg, district geologist, Western Natural Gas Co., Farmington, N. M.; and James A. Mullimax, district manager, Schlumberger, Farmington, N. M.

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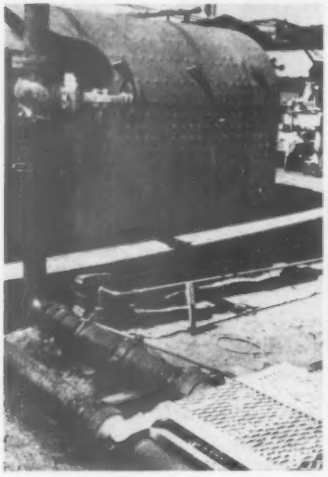
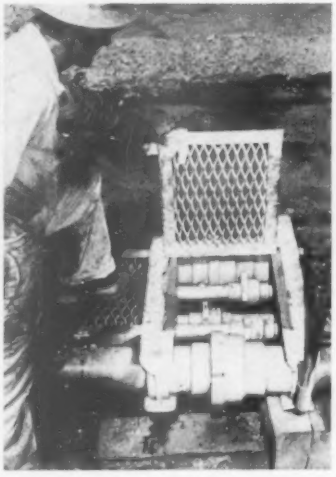
O. J. Lilly, consulting geologist, Albuquerque, N. M., began his geological training with Midwest Exploration Co. in 1927. He scouted for Stanolind Oil & Gas Co. from 1934 to 1947 with the exception of 4 years spent in the Navy. He was with Byrd-Frost, Inc., 1947-49, and with Southern Union Gas Co. as district geologist, 1949-51.





ADJUSTABLE NIPPLE on live-steam line of Shell rig allows 18-in. leeway in placement of boilers (left). Sleeve on steam exhaust also allows same leeway. Right: Misaligning union allows 15° misalignment in connecting piping. Blowout preventer and utility water lines are fitted in the space between the two main lines.

Unitization of Piping in Bundles Cuts Moving Time to 48 Hours

PROBLEM . . . How to speed up moving time of a rotary rig from location to location.

Solution . . . Unitize steam and water piping in bundles covered with expanded metal walkways, and fit the blowout preventer and utility water line in the space between the two main lines.

This was the answer, at least, in the case of Shell Oil Co., which effected these measures to speed moving time on its rig No. 12 in Helen Gohlke field, on the Texas Gulf Coast.

According to R. L. Walker, Houston area drilling engineer, each pipe end of the steam and water piping is equipped with a connecting union, and each package, or bundle, has a lifting eye at its center of gravity to facilitate loading.

The exhaust steam line forms one side of the bundle and the live-steam line forms the other side.

Plenty of leeway . . . An adjustable nipple on the live-steam line allows 18-in. leeway in placement of boilers. This nipple is used on high-pressure steam lines, and a sleeve is used on low-pressure steam lines, which also allows 18-in. leeway in placement of equipment.

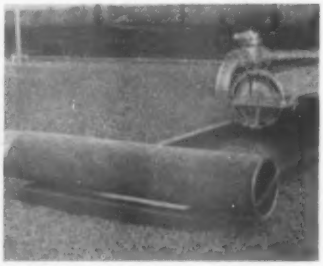
A "misaligning" union is used in connecting piping. The device allows 15° misalignment.

The blowout preventer and utility water lines are fitted in the space provided between the two main lines. By use of this setup, a move can now be accomplished in 48 hours, including release of the heavy steel rig on one location, to spudding in on the next location.

Sinclair Uses Scraper-Trap Strainer on Products Line

An effective strainer has been installed in the scraper trap serving the upstream line on a products carrier of Sinclair Pipe Line Co.

The strainer, designed by the Sinclair organization, is patented by L. B. Moon, vice president of Sinclair Pipe Line. It consists of a perforated sleeve covered with 50-mesh wire screen. Around this is buckled a wrapping of heavy steel-wire netting of the type known as "plaster cloth."



The photo shows a scraper-trap strainer on display at the company's Arlington, Tex., station.

LOOKING UP from bottom of 80-ft. shaft, showing reinstalled casing. Shaft is buttressed to protect casing from landslide.

Landslide "Foiled"

Well's casing protected by 80-ft. buttressed shaft

UNION OIL CO., faced with the problem of getting an old well which had been shut down for a number of years back onto production, encountered a new "twist" to add to difficulties on its Elkins lease near Fillmore, Calif.

This "twist" was an authentic one. The crew assigned to pull the tubing found that the casing had been twisted and bent by a shale landslide.

But the crew, undaunted, without use of any complicated or hard-to-get instruments spotted the exact location of the bend and the clean-out work completed satisfactorily.

Here's how it was done:

CLARENCE FROOME, left, district superintendent, and Ben Blanchard, production engineer for Union Oil, inspect the shaft.

First . . . A flashlight was lowered into the hole. By repeatedly pulling it up and down by a long cord, the crew, by taking measurements, spotted the location of the twist.

Second . . . After the twist was located, an 80-ft. shaft was sunk around the casing, and buttressed with heavy timbers. Refurbished casing was reinstalled.

The casing may seem gradually to move from one side of the shaft to the other, as the landslide continues, but since the shaft is about 10 by 6 ft. in size, it will provide protective space for the casing during the remaining span of the well's life.

Phillips Men's Gadget Aids In Polish-Rod Alignment

A tool has been made from small pieces of salvaged equipment to maintain casing alignment on pumping wells by three employes of Phillips Petroleum Co., Bartlesville, Okla.

The tool, made of a 3-in. length of 4-in. angle iron, a junk turnbuckle from a jack-post bearing rod, and a saddle from oversized casing, is resulting in considerable savings in operating and maintenance costs.

CASING-ALIGNMENT DEVICE is explained by Bill Hamil, left, to Ralph O'Neal, district superintendent, center, and Norman Perkins, Plains division superintendent for Phillips Petroleum Co.

The method of alignment is not new, and the idea has been tried from time to time in other areas. However, little was done toward its development.

In pumping operations there has always been the problem of keeping the polish rod in alignment with the stuffingbox. Casing heads shift from time to time causing excessive wear of the rod against stuffingbox rubber. After a time equipment must be replaced, meaning loss of production, expense of new parts, and well-servicing costs.

Escape of oil through worn stuffingbox rubbers also causes hazardous conditions around wells making it necessary for pumpers to spend extra time cleaning up the areas.

The device suggested by the three, Bill Hamil, Bill Lowther, and Basil Hampton, helps to eliminate these operating difficulties.

Lab on Wheels

G.P.M. testing unit has many automatic controls

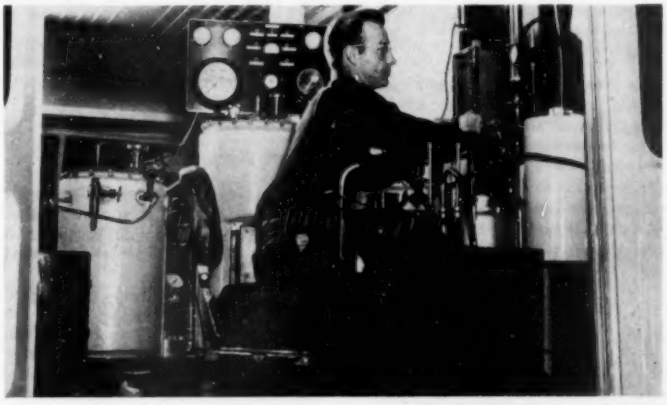
A "LABORATORY on wheels" has been designed by G. O. Kimmell of Kimray Co., Oklahoma City, which is said to have many improvements over similar units now in use. Many controls are automatic.

The equipment is designed to test the gallons per minute of entrained fluid in the gas stream of a well.

By taking a representative sample from the well head, the amount of distillate or oil a well is making can be determined. The unit separates and processes separately gas and fluid on a miniature scale, just as it is done in full-scale operations.

Easy to use . . . Kimmell has designed his unit with the ease of the operator in mind. Sitting in the center of an "ampitheater" surrounded by complicated equipment, he can handle all controls either by himself or with one assistant.

Kimmell is a pioneer in developing the method used for obtaining and processing samples.



SEATED IN THE AMPITHEATER with all controls at his fingertips, William W. Gardner, chemist, tests equipment in the new G.P.M. mobile testing unit designed by G. O. Kimmell of Oklahoma City.

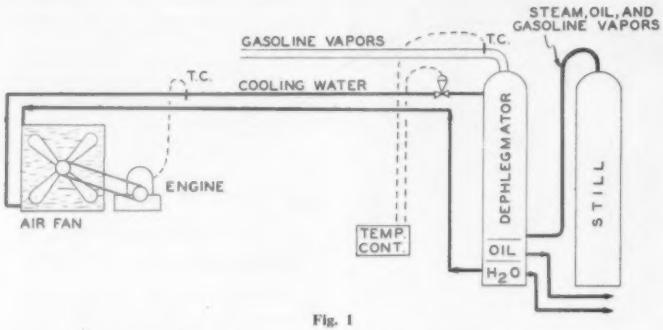


Fig. 1

Automatic Controller

Used on air fan drive for dephlegmator cooling water, it keeps constant temperature, eliminates human error

AN automatic control for the air fan drive (Fig. 1) used for dephlegmator cooling water has been devised by M. J. Hensley, operator for Phillips Petroleum Co. at the Fullerton, Tex., plant, which keeps a constant temperature on the cooler outlet.

A large amount of water is needed for the dephlegmator reflux to assure contact with all the rising vapors. However, if this water temperature from the fan cooler is too low the dephlegmator top temperature controller will not permit enough water to enter the dephlegmator to assure contact with all the rising vapors. This causes some oil to carry over with the gasoline vapors.

If the water temperature from the cooler is too high it will not cool the dephlegmator again, causing oil to carry over.

How it works . . . By placing a thermocouple in the water line from the dephlegmator air fan and connecting to a temperature controller, the control valve on the fuel to the air-fan drive is adjusted so that a constant temperature can be maintained.

As the water temperature drops the fuel supply is cut down, reducing the fan speed and thereby causing the temperature of the water to rise. By carrying the temperature at the desired value, the danger of a freezeup is eliminated.

Operation of the dephlegmator top temperature controller will be smoother with near constant temperature water. If the temperature of the water is at the optimum, better contacting of overhead vapors is obtained, which will reduce any carryover of mineral seal oil.

Carburetor . . . The carburetor in use has to have a constant pressure on the gas to assure the proper mixture for combustion. Therefore, the control must be on the accelerator rather than the fuel pressure to the carburetor (Fig. 2).

By hand controlling, favorable operations have been obtained, but automatic control is more satisfactory, since it eliminates human error.

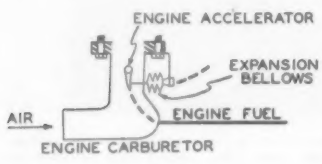


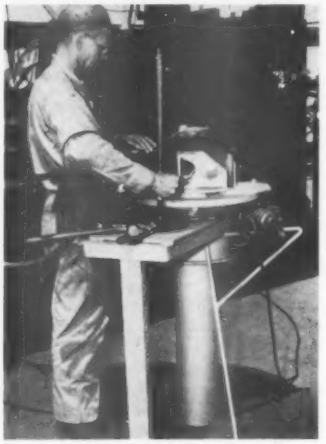
Fig. 2

Boom Aids Drum Filling

Filling of metal drums with asphalt can be made easier by use of a boom which contains six nozzles so that two operators can each fill three drums simultaneously.

The boom is a steam-jacketed pipe attached with a swivel to a riser in the center of a circle (see picture). The boom is equipped with a supporting truss extending from one end to the other, in addition to a tandem-wheeled dolly. Spindles for the pneumatic-tired wheels are set into a frame similar to that used for motorcyles.

Nozzles on filler spouts contain quick open-and-shut valves, and spouts are spaced so that each filler will automatically come to rest, as the boom is moved, over the open hole of the drum. Empty drums are placed in a position similar to the spokes of a large wheel, each simulated spoke containing six drums so that two men operating the apparatus need only to spot one spout, which automatically brings the others directly above the drums.

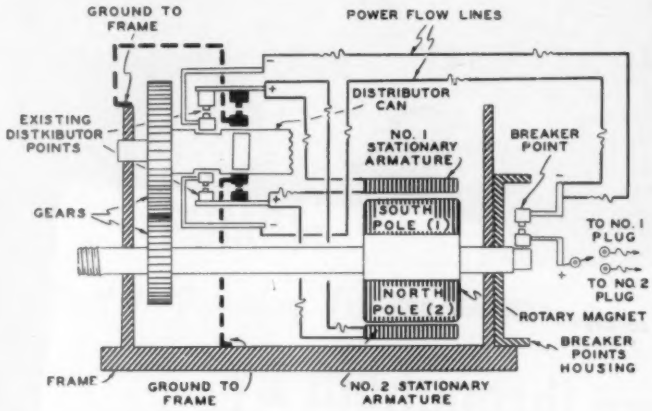


Device Speeds Removal of Tubes From Tube Turns

A device which speeds up the operation of removing tube turns from wornout tubes has been developed by Harvey T. Dennis, a welder at General Petroleum Corp.'s Torrance, Calif., refinery.

Dennis hated to see good tube turns thrown on the scrap heaps when the tubes to which they were attached wore out. However, cost of detaching them by hand for reuse was prohibitive.

So he designed the mechanical device which speeds up the operation sufficiently to make it worth while. It has resulted in a considerable saving in steel.



Extra Distributing Points Cut Down Magneto Arcing

The installation of two additional distributing points on two-cycle compressors has eliminated arcing across breaker points which previously had caused frequent shutdowns to replace the burned-out breaker points.

The compressors are equipped with two-pole, two-distributing-point magnetos. Power produced from only one side of the pole is utilized by the engines and only two distributing points are used on the distributing cam to fire the cylinders.

To compensate for the additional power generated by the magneto, two additional distributing points were installed on the distributing cam (see sketch). These points are connected to the pole from which the power is not used and are grounded to the magneto frame. Power from the idle side of the pole is harmlessly diverted to ground instead of arcing through the breaker points.

The method was suggested by Harris J. Levert, machinist for Esso Standard Oil Co., Baton Rouge, La.

Electric Motor Used to Power Gasket Cutter

Cutting heavy-duty gasket material can be done with ease and efficiency when an electric motor is used to power the cutter, according to Sinclair Refining Co., Houston.

Using a hand cutter is not only time-consuming and tedious but the quality of the gaskets is often poor.

The storekeeper lists the following advantages with the power cutter,

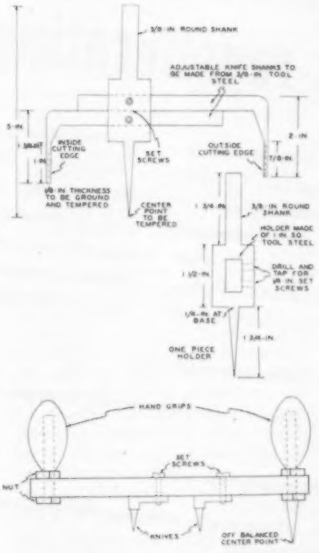


DIAGRAM of gasket cutter, top. Below, hand-grip cutter.

which can be easily fabricated in any machine shop:

1. Method is rapid.

2. New knives can handle 14 sheets of ⅛-in. material with this method as opposed to only about 7 sheets by the old system.

3. Knives can be easily adjusted for cutting special gaskets.

4. Center point of knives being near the assembly, perfect gaskets are produced with less being ruined as in the other method.

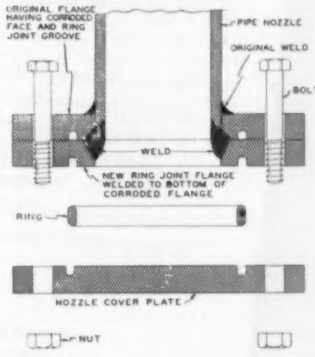
5. Only one set screw on assembly allows quick changeover to new gasket size.

6. All parts can be made in plant.

Bottom Nozzles on Separator Drum Repaired "On the Job"

An "on-the-job" repair of corroded flanges on the bottom nozzles of separator drums saved the down time which would have been required with a repair shop job.

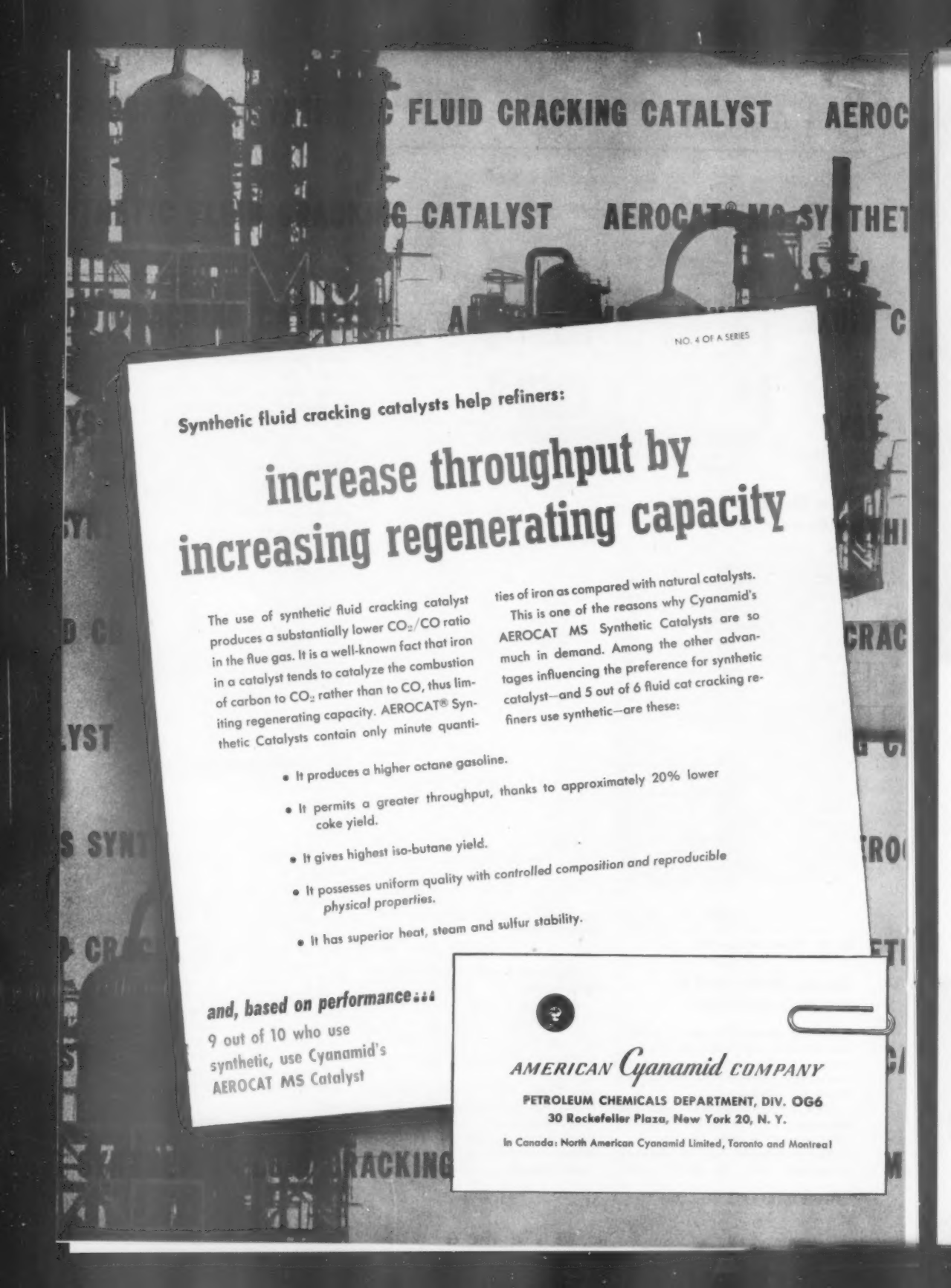
The corrosive nature of this oil in the separator drums causes pitting of the portion of the flange face inside the ring seal. Such an attack reduces the thickness of the flange and also cuts down on the thickness of the ring groove shoulder. As a result, the effective depth of the ring groove is reduced and the ring gasket can no longer seat itself properly.



Usually such a flange is repaired by building up with weld metal and then remachining both the face and ring groove to original dimensions Such a procedure would have required the cutting off of the flanges and sending them to the repair shop. During this time, the unit would have been out of service.

The delay under such a routine was circumvented by the use of an additional flange (see sketch). The new flange was welded to the existing corroded flange and the elapsed time was a fraction of that which would have been required under the other conditions.

The method was suggested by Albert J. Caston, Sr., foreman of the pipe department of Esso Standard Oil Co., Baton Rouge, La.



NO. 4 OF A SERIES

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THE JOURNAL'S WEEKLY
Engineering Reference
SECTION
No. 9

PUMPS:

Part 9—Pumping Viscous Liquids

by Gerald L. Farrar
Engineering Editor

PUMPING viscous liquids with reciprocating and centrifugal pumps has been discussed in previous installments. Use of rotary pumps in this application is discussed here.

Rotary Pumps*

It has been found that to pump efficiently without vibration, noise, or capacity reduction, the pump speed should be reduced as the viscosity of the liquid handled is increased.

Other factors, such as pressure conditions at pump inlet, entrained air or vapor, air or gas in solution, and pump size and design, also influence the speed permissible for a given viscosity.

Fig. 1 gives approximately the relation of pump speed to viscosity where pumping conditions are such that the liquid will not vaporize, and is free of dissolved air or gas and entrained air.

Fig. 1 applies to rotary pumps of conventional design. The values are not to be considered limiting, as operating conditions or special design features will permit exceeding the values shown.

*This discussion on rotary pumps has been taken from the Standards of the Hydraulic Institute, ninth edition, 1951, by permission of the institute.

Entrained and dissolved gases... Most liquids, particularly petroleum oils, because of their viscosity and affinity for air and other gases, are susceptible to air or gas entrainment.

Many factors are associated with the amount of entrained air that can exist in a given installation. It is prevalent in systems where the liquid is circulated repeatedly and during each cycle is exposed to air or is mechanically agitated in air.

Besides being capable of entraining air, many liquids are known to contain air or gas in solution. The solubility of air in liquids varies with the type of liquid, time and conditions of exposure to atmosphere, etc. Lubricating oils at atmospheric pressure and temperature may contain up to 10 per cent of dissolved air by volume; under similar conditions, gasoline may contain as much as 20 per cent in solution.

Entrained and dissolved air or gas in liquids handled by rotary pumps are the most important factors affecting pump performance, both mechanically and hydraulically, especially where reduced inlet pressure exists. When rotary pumps are operated with inlet pressure below atmospheric, entrained gas in the liquid will expand and take up part of the pump displacement, thereby reducing its liquid capacity. Where liquid contains dissolved gas and the pump inlet pressure is reduced, the gas is freed and expands, thereby reducing the pump liquid capacity.

The liquid displacement of rotary pumps is reduced at least in direct proportion to the amount of air or gas present at the inlet flange of the pump. Actually the reduction is greater depending on the amount of pump clearance volume.

Fig. 2 indicates the effect of entrained gas on the liquid displacement of a rotary pump at different pressures below atmospheric.

Fig. 3 indicates the effect of dissolved gas on the liquid displacement of a rotary pump at different inlet pressures below atmospheric.

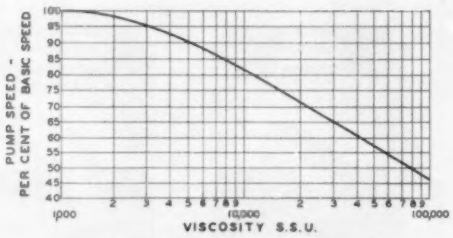


Fig. 1—Relation of pump speed to viscosity.

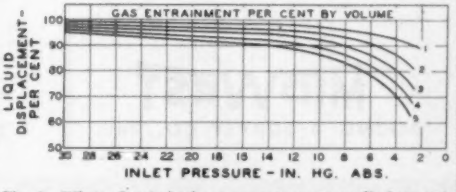


Fig. 2—Effect of entrained gas on rotary pump displacement.

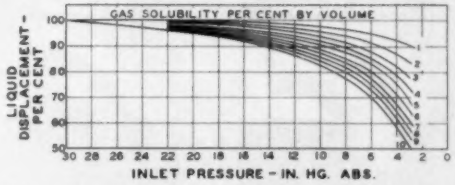
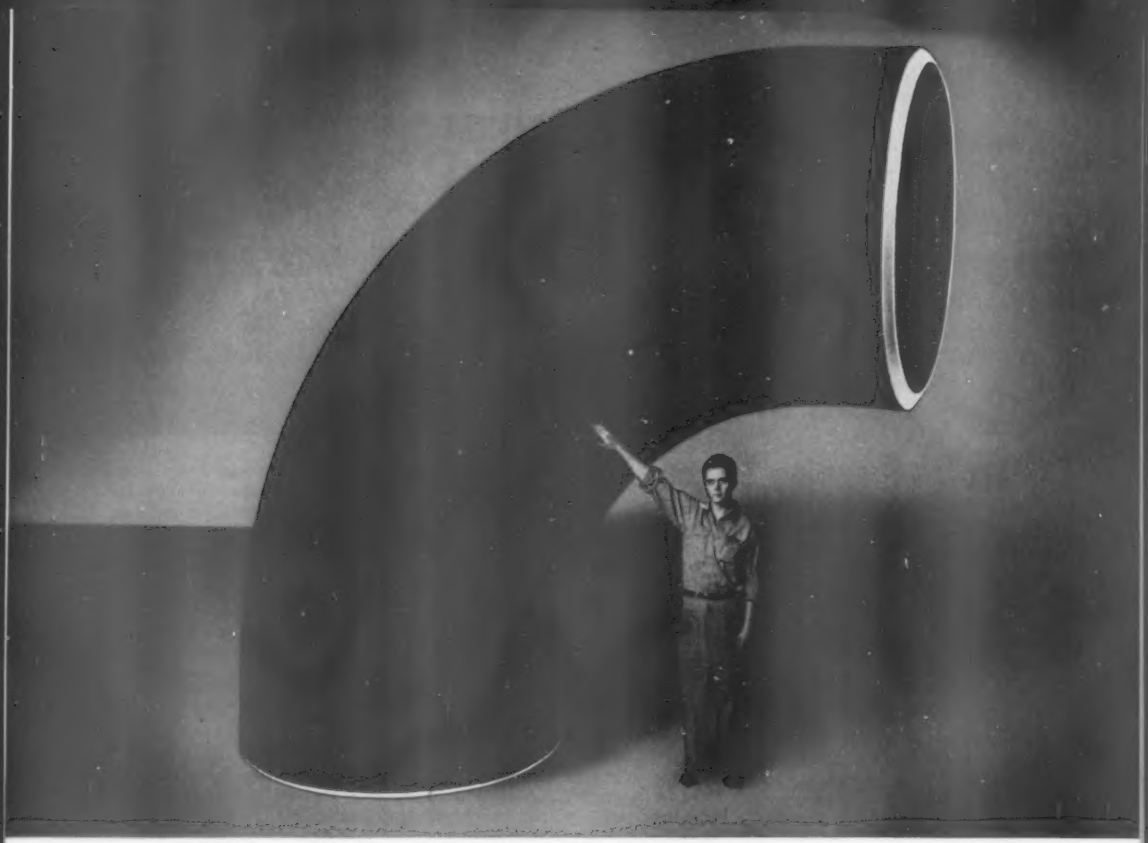


Fig. 3—Effect of dissolved gas on rotary pump displacement.



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by W. L. Nelson
Technical Editor

QUESTIONS ON TECHNOLOGY

Replacement Value and Depreciation Rate

What are customary depreciation rates on refinery equipment and how is the great increase in construction costs taken into account? M. N. T.

Low depreciation rates or long equipment lives are now employed. Thus, Bulletin F of the Bureau of Internal Revenue, U. S. Department of the Treasury, indicates an average useful life of 25 years for a complete refinery or a depreciation rate of about 4 per cent. Many or most parts of a refinery do not last for 25 years. Some parts may be replaced several times during 25 years. However, the customary maintenance rate of 4 per cent will provide replacements, repairs, etc., that greatly lengthen the useful life of the plant. Careful management during repairs and replacements can also in some degree eliminate obsolescence. Some especially competent organizations or process engineering departments are able, by reassembling the equipment at frequent intervals and by modest expenditures, to keep in a nearly modernized condition at all times. Thus, no one can state exactly when an original installation is retired from service because the original installation no longer exists

The use of a somewhat constant depreciation rate based on the original investment cost is not of much use during periods of great inflation or deflation. The situation is indicated in Table 1 for the inflationary period of 1935-1952 for a plant whose useful life is considered as 20 years. The meaning or significance of the several columns of Table 1 are:

Column 1—Years.

Column 2—Cost of building a new plant to replace the old one. The installation costs are based on the Nelson Construction Cost Index (The Oil and Gas Journal, Refinery page, first issue each month). This is the amount of insurance that must be carried in order to replace the plant in event of destruction.

Column 3—Value of the plant (inflated) if its life is 20 years and if the original investment is repaid in 20 equal installments (a rate of 5 per cent). A minimum of this amount of insurance is necessary in order to break even at any time. It does not provide for the cost of a new plant in event of destruction but it does care for the old or remaining value of the plant. Had no inflation occurred, these values would have decreased uniformly by $430,000 per year to a value of zero in 1955.

Column 4—Yearly payments to a Replacement Fund that will replace the original investment of $8,600,000 (in 20 equal yearly payments) and will at the same time accumulate the capital required by inflation. Note for the estimated deflationary years of 1953-1955 that the replacement fund grows to a maximum of $21,600,000 by 1952 and if construction costs decrease in 1953 and thereafter, the fund contains extra money or profit.

Column 5—Column 4 stated as a percentage of the original investment. Note that the Depreciation and Replacement rates are well above 5 per cent for the period 1935-1955, averaging about 9.5 per cent, and between 1935 and 1952 nearly 12 per cent. Such a depreciation rate would be a somewhat proper rate for conditions throughout these years if depreciation is considered as a replacement fund.

Column 6—Yearly payments if the re-

TABLE 1—SOME REALISTIC DEPRECIATION OR REPLACEMENT RATES FOR THE PERIOD 1935-1955

Year	New plant value or insurance value	Remaining inflated value of plant after depreciating at 5% of original investment	Replacement of original investment at 5% per year plus inflation in value		Replacement of original investment based on inflated residual value at the end of each year		Depreciation, per cent of original investment based on 5% of inflated new plant value
			$/year	Per cent	$/year	Per cent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1935	8,600,000	8,600,000	.....	....	.....	....	....
1936	9,200,000	8,770,000	1,030,000	12.0	430,000	5.0	5.0
1937	10,200,000	9,340,000	1,430,000	14.3	460,000	5.4	5.4
1938	10,500,000	9,210,000	730,000	8.5	517,000	5.9	5.9
1939	10,500,000	8,780,000	430,000	5.0	534,000	6.2	6.1
1940	10,600,000	8,450,000	530,000	6.2	535,000	6.2	6.1
1941	10,950,000	8,370,000	780,000	9.1	541,000	6.3	6.2
1942	11,450,000	8,440,000	930,000	10.8	566,000	6.6	6.4
1943	11,850,000	8,410,000	830,000	9.6	605,000	7.0	6.7
1944	12,100,000	8,230,000	680,000	7.9	639,000	7.4	6.9
1945	12,300,000	8,000,000	630,000	7.3	661,000	7.7	7.0
1946	13,700,000	8,970,000	1,830,000	21.3	681,000	7.9	7.1
1947	16,000,000	10,840,000	2,730,000	31.8	836,000	9.7	8.0
1948	18,100,000	12,510,000	2,530,000	29.4	1,125,000	13.1	9.3
1949	19,100,000	13,080,000	1,430,000	16.6	1,425,000	16.6	10.5
1950	20,000,000	13,550,000	1,330,000	15.5	1,590,000	18.5	11.1
1951	21,600,000	14,720,000	2,030,000	23.6	1,970,000	22.9	11.6
Estimated							
1952	21,600,000	14,290,000	430,000	5.0	2,120,000	24.6	12.5
1953	20,600,000	12,860,000	*—570,000	*—6.6	2,460,000	28.6	12.6
1954	19,200,000	11,030,000	*—970,000	*—11.3	2,000,000	23.2	12.0
1955	16,400,000	7,800,000	*—2,370,000	*—27.6	505,000	5.9	11.2

*Extra money in the replacement fund because construction costs are decreasing.

maining inflated value each year is divided by the remaining years of life. This results for the period 1935-1952 in a somewhat constant property value of 7 to 9 million dollars even though the original 8,600,000 (plus inflation) is being retired. Thus, a considerable residual value remains up to 16 of the 20 years of life because inflation has occurred so rapidly that depreciation payments never equaled the increase in value of the residue.

Column 7—Column 6 stated as a percentage of the original $8,600,000 investment.

Column 8—Depreciation rate of 5 per cent (20 year life) of the New Replacement Value (Column 1) stated as a percentage of the original $8,600,000 investment. Such a method has no great merit except that it is easy to apply. During this period it did not provide enough funds to replace the original installation.

All of these figures clearly show that customary depreciation rates are of little significance during periods of inflation. Although they are sufficient to provide for the repayments of a fixed original loan, they fail altogether to constitute a replacement fund by which the original installation can be duplicated after it is worn out. If depreciation is to be considered as a means of replacing the installation at any time, an average rate of 7.5 to 12 per cent would have been necessary during the period 1935-1952 rather than the customary 4 or 5 per cent.

In a similar way, insurance in the amount of the original investment would have to be continued throughout most of the useful life of the equipment even though it is gradually becoming useless, because inflation has been constantly increasing the value of the used or old equipment. (See Column 3.) If insurance is looked upon as a means of replacing the entire original installation, then the amount of insurance will vary year by year regardless of the age of the plant (see Column 2).

Specific Depreciation Rates

The accumulation of actual depreciation rates is difficult because each accounting department establishes different accounts, some companies use higher rates of depreciation for their own books than they are allowed to present to the government for tax purposes, and some refiners expect depreciation to care, to some extent, for obsolescence and replacement. However, Table 2 herein shows a few specific rates.

References

1. Bureau of Internal Revenue, Income Tax Depreciation and Obsolescence, Estimated Useful Lives and Repreciation Rates, Bulletin F., U. S. Treasury Department, January 1942.

2. Nelson, W. L., Petroleum Refinery Engineering, 3rd Ed., McGraw-Hill Book Co., Inc., N. Y., 1949, also "Amortization and Depreciation Rates," The Oil and Gas Journal, February 3, 1949, p. 90.

3. Private communications to author since the listings of Reference 2 were published.

TABLE 2—USEFUL LIVES OF REFINERY EQUIPMENT
(Divide these into 100 to obtain percentage rate of depreciation)

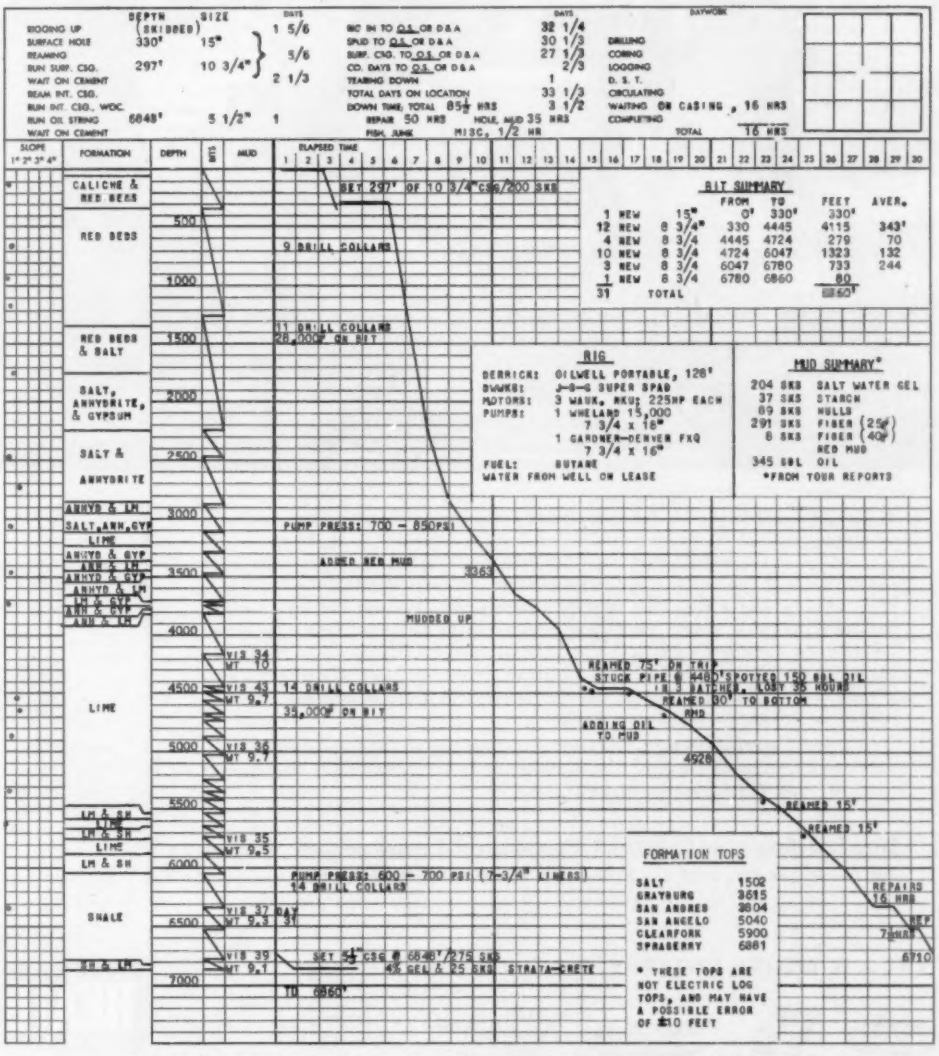
Equipment—	Bulletin F (revised Jan. 1942)[1]	Author[2]	Some companies[3]
Acid manufacture or recovery			20
Agitators, treating vessels	25	7-16	16½
Air compressor and receiver equipment	22½		22½
Asphalt handling lines and pumps			20
Buildings, plant		12-33	20
Buildings, brick and concrete		34	50
Buildings, wood, metal, Transite, etc.		10-20	20
Boiler plant equipment			20
Boilers	14-25	6-10	
Carbon black plants	20		
Catalytic cracking plants		*5	15
Chemical plants, alkylation, isomerization, polymerization, alcohol, etc.		*5	8-25
Compounding equipment (piping, pumps, etc.)			20
Condenser:			
Boxes	25	10-20	
Coils	25	4-10	
Tubular	20-25	3-10	
Construction and shop equipment	4-25	7-12	20
Conveyors and drives			20
Cracking plants	15	4-10	13½
Cracking plants, combination			13½
Cracking stills:			
Piping		2½ to 4	
Condensers		3-8	
Debutanization, stabilization, etc.			20
Distillation units:			
Fire	15		
Steam	20	7-12	18
Vacuum	20	7-12	18
Pipe or tube	15	7-12	15
Electric power and light		36	20
Electric transformers			25
Exchangers	20	4-16	
Filtering plants or equipment	25		20
Filters and bins			30
Filter presses			25-30
Fire protection equipment	10		20
Firebanks and firewalls			30
Gas recovery or natural gasoline plants	15	12½	20
Hydrogenation plants			13½
Laboratory equipment		3-5	15
Loading racks		10-13	25
Loading racks at wharves			20
Loading racks, pumps and piping			20
Office furniture and equipment		10	7½ to 20
Packaging and package manufacture			20
Phenol treating			15
Pumping equipment and compressors	20	6-16	20
Piping, interunit and interrefinery	25	4-14	20
Roads, fences, bridges, and culverts			25
Sanitary facilities			20
Settling equipment			20
Sewers and traps	25	20-25	30
Steam, mains			25
Storage tanks:			
Working or rundown		10-20	25
Refinery storage	30	20-33	30
Farm, incl. lines			20
Tanks, treating	20	7-16	
Telephones and such equipment	20		20
Treating equipment			16½
Trucks and automobiles	3-8	3-4	4-8
Towers, fractionating	20	16	
Water supply—mains, concrete intakes, wells, dams, reservoirs			30
Water, pumps and piping			20
Wax plants	25	20	18
Wax presses			30
Wharves and piers, concrete			30
Wharves and piers, timber			20
Refinery—complete	25	12-17	18-22

*Stated while such processes and plants were being developed.

Spraberry Drill-Log

Contractor: Big Chief Drilling Co.
Owner: Sohio Petroleum Co.
Well: Davenport "C"-8.

Location: Section 11, Block 37, T 5S, T&P Survey, Glasscock County, Texas.



BIT SUMMARY

			FROM	TO	FEET	AVER.
1	NEW	15"	0'	330'	330'	
12	NEW	8 3/4"	330	4445	4115	343'
4	NEW	8 3/4	4445	4724	279	70
10	NEW	8 3/4	4724	6047	1323	132
3	NEW	8 3/4	6047	6780	733	244
1	NEW	8 3/4	6780	6860	80	
31		TOTAL			6860'	

RIG

DERRICK: OILWELL PORTABLE, 128'
DRAWS: J-8-G SUPER SPAD
MOTORS: 3 WAUK. RKU; 225HP EACH
PUMPS: 1 WHELAND 15,000 7 3/4 x 18"
1 GARDNER-DENVER FXQ 7 3/4 x 16"
FUEL: BUTANE
WATER FROM WELL ON LEASE

MUD SUMMARY*

204 SKS	SALT WATER GEL
37 SKS	STARCH
89 SKS	HULLS
291 SKS	FIBER (25#)
8 SKS	FIBER (40#)
	RED MUD
345 BBL	OIL

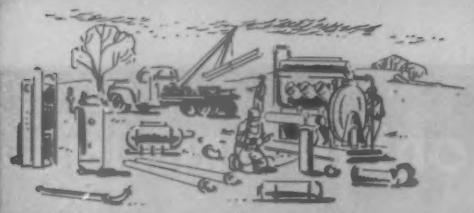
*FROM TOUR REPORTS

FORMATION TOPS

SALT	1502
GRAYBURG	3615
SAN ANDRES	3804
SAN ANGELO	5040
CLEARFORK	5900
SPRABERRY	6881

* THESE TOPS ARE NOT ELECTRIC LOG TOPS, AND MAY HAVE A POSSIBLE ERROR OF ±10 FEET

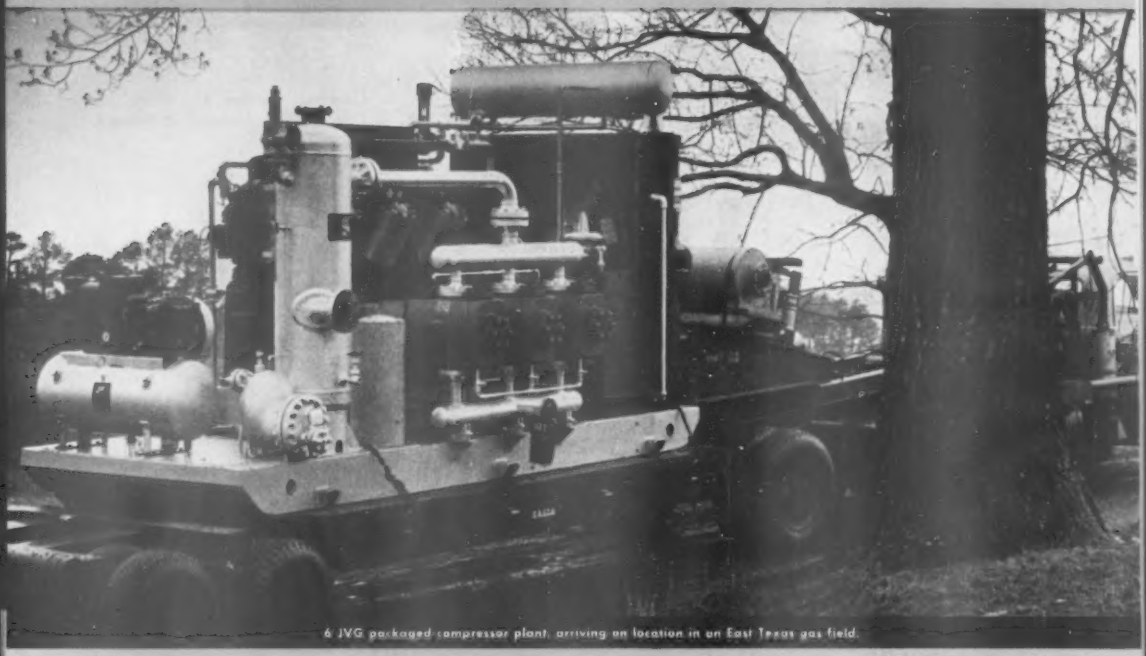
Compiled for The Oil and Gas Journal by Drilling Data Service, Oklahoma City.



Why

ASSEMBLE IT IN THE FIELD?

Why field-assemble your compressor plant . . . with the greatly increased expense that results from installing all of the separate components at the site with field labor?



6 JVG packaged compressor plant, arriving on location in an East Texas gas field.

With a Beaird-Ingersoll-Rand packaged compressor plant you receive a complete plant . . . delivered at the site fully assembled . . . ready to put on stream . . . at the lowest cost per horsepower, installed. You are free from the expense of requisitioning, warehousing and transporting the hundreds of necessary parts required in a complete plant. You do not risk letting the shortage of a single small part cause hours of costly delay for your entire crew. You are sure that all of the piping, manifolds and vessels are correctly sized and fitted — that all components are properly aligned and levelled. And you are relieved of the responsibility of smooth, efficient operation when the plant is installed.

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FABRICATING
STEEL WAREHOUSE

SINCE 1918
BEAIRD
SHREVEPORT

LOWEST COST PER HORSEPOWER, INSTALLED

No. 125

REFINER'S NOTEBOOK

Cost Comparison . . . When using back-pressure relief valves

by S. Chesler* and B. W. Jesser†

IN the preceding installment an example was given for cost comparison of closed relief-valve discharge system when setting the relief valves below the vessel design pressure. A second method of reducing costs, namely the use of back-pressure relief valves, will be taken up now in the form of an illustrative example.

In order to evaluate the savings that may be achieved by using back-pressure relief valves, a typical refinery flare system consisting of several units was laid out (Fig. 1). The line sizes were calculated using 10 per cent and 25 per cent systems with conventional relief valves and 50 per cent and 80 per cent systems using back-pressure relief valves except on those vessels where excess pressure was available, and thus, the premium for the back-pressure valve could not be justified. Table 1 summarizes the results of the line calculations and the installed costs for the various systems. From this table the reduction in line sizes and costs that can be achieved by the use of back-pressure relief valves is readily apparent. The main refinery header has been decreased from 28 in. for the 10 per cent case with conventional valves to 16 in. for the 80 per cent case with back-pressure valves. Similar reductions in line sizes were made for the individual leads and other headers. The reduction in cost for the two cases cited was from $89,900 to $58,600.

*Piping engineer, and †head of piping analytical section, M. W. Kellogg Co. From paper presented at Toronto, Ont., meeting of A.S.M.E.

TABLE 1—EFFECT OF USING BACK-PRESSURE RELIEF VALVES IN A REFINERY FLARE SYSTEM

	Line sizes in inches			
	Conventional relief valves		Back-pressure relief valves	
Back pressure—	10%	25%	50%	80%
Line RV-1*	14	12	8	8
Line RV-2*	4	3	3	3
Line RV-3*	18	16	10	10
Line RV-4*	10	6	6	6
Line RV-5*	24	18	14	12
Line RV-6*	8	6	6	6
Line RV-7*	12	8	6	6
Line RV-8*	16	12	10	8
Line RV-9*	28	22	20	16
Line RV-10*	28	22	20	16
Cost of variable items†	$67,300	$53,400	$44,300	$36,000
Cost of constant items‡	22,600	22,600	22,600	22,600
Total cost	$89,900	$76,000	$66,900	$58,600

*See Fig. 1 for identification of line numbers. †Includes installed cost of piping and relief valves, etc. ‡Includes cost of flare drum, stack, foundations, pumps, supports, etc.

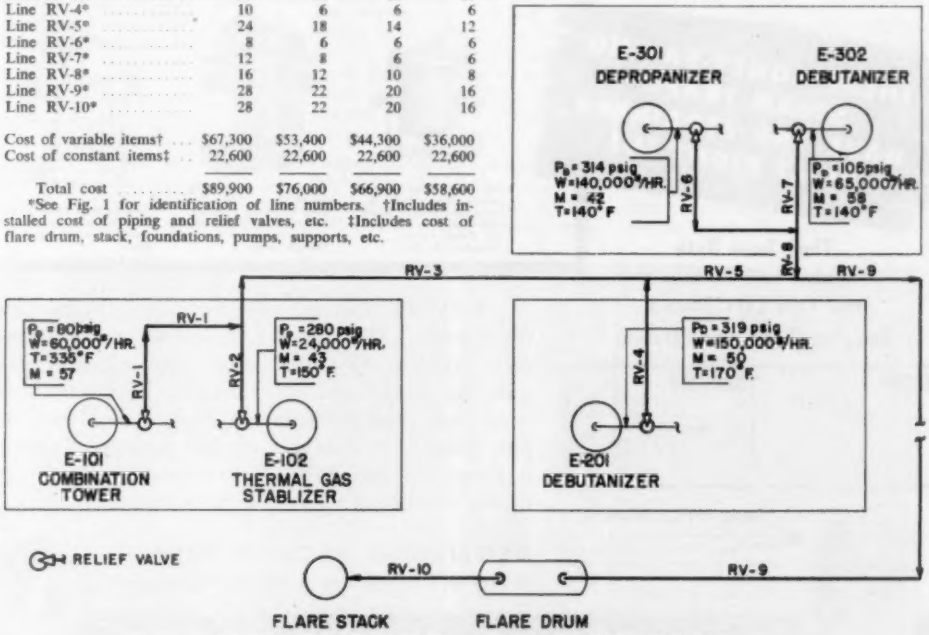

Fig. 1—Closed relief valve discharge system to flare drum and stack.

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OIL STATES EQUIPMENT COMPANY
Houston, Texas
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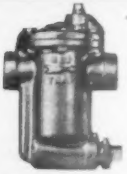
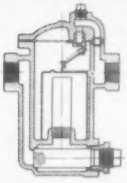
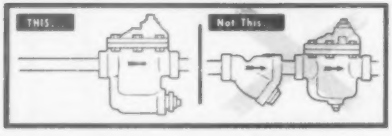


No. 881 ½" or ¾" pipe connections. 250 lbs. max. operating pressure. 830 to 1060 lbs/hr capacity. Height—7⅛". Weight—6 lbs.



Chrome steel valve and seat. Stainless steel trim. Cast semi-steel cap and body.

They Save Both Labor and Fittings and Cost Less Than a Separate Trap and Strainer



● EVERY plant has need for small traps the size of the Armstrong No. 880 and 881 and the small orifices in such traps are apt to need protection against dirt and scale. Therefore, reasoned Armstrong engineers, why not make small traps available with integral strainers to simplify installation and save time and money? The answer is pictured above. For complete information call your nearby Armstrong Representative, or write:

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ARMSTRONG STEAM TRAPS

How to Protect Storage Tanks—2

Coal-Tar Coatings

Enamel heating . . . Enamel is cut for charging into a melting kettle, and suitable means are provided for the avoidance of contamination with grass, dirt, or other foreign matter. The melting kettle load, i.e. quantity sufficient for 3 to 4 hours' use, is brought to application temperature (325° to 375° F.). The temperature does not exceed 400° F. during heating, and no batch of melted enamel is held at application temperature longer than 4 hours.

During the time that the enamel is in the molten condition in the kettle, it is thoroughly stirred with a metal paddle at intervals not exceeding 15 minutes. Enamel heated to temperatures in excess of the stipulated maximum is discarded. Caution against overheating or prolonged heating cannot be overemphasized. The heating kettle is emptied and thoroughly cleaned at the end of each working day.

Enamel application . . . Before the enamel is applied by pouring, primed surfaces are carefully cleaned to remove water, dust, oil, or other foreign material. Special care is exercised to make certain that the tank bottom is dry, because the presence of moisture will cause a porous coating which will permit localized corrosion.

To prevent tracking dirt into the tank and to prevent workmen from temporary blindness when they step from bright sunlight into a dark tank, two groups of men are used in transporting the enamel. One group brings the material to the tank entrance, and the other group carries it into the tank for application.

The enamel is strained through insect screen as it is drawn from the kettle. Pouring is effected with cans which have a wide spout (4½ in. by ¾ in.), and the enamel is spread by brushing with a three-knot brush. Seams are initially coated by pouring and brushing parallel to the seam, and a secondary coating is applied perpendicular to the seam.

Thickness of the finished enamel coat varies from 3/32 to 3/16 in. The coating shown in Fig. 1, although covered with dust, exemplifies the smooth, glossy finish obtained by proper heating and application. In contrast, Fig. 2 shows blistered enamel which resulted from overheating.

Coating under roof supports . . . Prior to priming of the tank bottom, roof columns are raised approximately 6 in. Proper cleaning, priming, and coating are effected on the bottom and column base. Two pours of enamel, each approximately 3/32 in. thick, with a layer of cloth reinforcement imbedded between, are applied under each column. The enamel is allowed to harden for at least 10 minutes before the column is lowered.

In floating-roof tanks a ¼-in. by 15-in.-square plate, both sides of which have been primed, is placed under the roof support before the support is lowered.

Repairs . . . Slight cracks in the enamel, at which points the coating has not lost its bond, are repaired by the application of one or two coats of enamel over the defects. When the coating is actually damaged, all loose enamel is removed. The damaged area is cleaned and reprimed. Adequate drying is effected, and fresh enamel is applied.

Service performance . . . Application of coal-tar-base bottom coatings was initiated in 1946. As of this date, 12 bottoms have been coated. Inspection of two coatings after 6 years' service disclosed the coal-tar-base material to be unaffected, with the exception that the surface gloss was lost at points where crude oil had been discharged directly against the coating.

Fig. 1—Finished enamel coating.

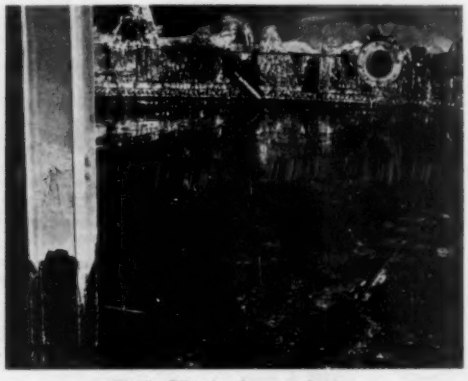

Fig. 2—Blistering from overheating.

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Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. This list is compiled from surveys made by The Oil and Gas Journal.

Crude-Oil Pipe Lines

American Petroleum Co.—30 miles, 6-in., under way, Village Mills to Arriola Field, Hardin County, Texas. J. R. Stewart, contractor. Completion date 5-15-52.

8 miles, 12-in., authorized, looping Samaria to Earhart, Mich.

15 miles, 12-in., authorized, looping Sylvania, Ohio southward

Cities Service Pipe Line Co.—64 miles, 18-in., planned, Sour Lake, Tex., to Lake Charles, La. Completion date 1-1-53.

19 miles, 8-in., under way, Cushing to Guthrie, Okla. Gragg Const. Co. Completion date 6-1-52.

Continental Pipe Line Co.—165 miles, 8-in., contracted, Rincon to northwest of Sullivan City on to Port Isabel, Tex. Western Const. Co. Completion date 9-30-52.

217 miles, 12-in., authorized, Wichita Falls, Tex., to Ponca City, Okla. Completion date 1953.

Gulf Refining Co.—80 miles, 24-in., proposed, Midland to Colorado City, Tex.

Humble Pipe Line Co.—4, 6, 8, 12-in., proposed, Upton and Reagan counties, Texas.

201 miles, 12-18-in., planned, Hawkins to Baytown, Tex.

Interstate Oil Pipe Line Co.—33 miles, 20-in., under way, Bunkie to Melville, La. Latex Const. of Georgia. Completion date 5-52.

68 miles, 16-in., authorized, Raceland to Anchorage, La. Completion date 10-52.

18 miles, 13-in., authorized, LaRose to Raceland, La. Completion date 10-52.

47 miles, 16-in., authorized, Sunset to Anchorage, La. Completion date 12-52.

21 miles, 12-in., planned, Duck Lake and Bayou Sale to New Iberia, La. 7-31-52.

36 miles, 16-in., planned, Flora to Bunkie La. Completion date 12-31-52.

42 miles, 4-6-10-in., planned, Esperance Pt., Fairview & Lisemore Landing, La., to Cranfield, Miss. Completion date 8-15-52.

Pan American Pipe Line Co.—37 miles, 26-in., planned, Genoa to Texas City, Tex. Completion date 12-52.

40 miles, 14-in., planned, Arden Station in Irion County to Eldorado Station in Schleicher County, Tex. 6-52.

Pasotex Pipe Line Co.—195 miles, 8-in., under way, El Paso to Wink, Tex.

Platte Pipe Line Co.—1,075 miles, 16, 20-in., under way, Worland, Wyo., to Wood River, Ill. Completion date 1952.

573 miles, 16-20-in., under way, Worland, Wyo., to Holdredge, Neb. R. H. Fulton & Co., contractor. A. A. Carrigan, spreadman at Scotts Bluff, Neb.

143 miles, 20-in., under way, Holdredge, Neb., to Kansas State Line, Fulton & Brodie, contractor, J. T. Brodie, spreadman.

Section 7. 274 miles, 20-in., Missouri River to Salisbury, Mo., and Section 8, Salisbury to Mississippi River, under way. O. R. Burden Construction Co. Al Perry, spreadman at Carrolton, Mo.; river crossing field office, Hartford, Ill., Dick Jernigan, spreadman.

Progress Pacific Pipe Line Co.—900 miles, 20-in., proposed, Permian basin, West Texas to California.

Rancho Pipe Line System.—455 miles, 24-in., authorized, McCamey to Houston, Tex. Completion date late 1952. (Joint project with Sinclair Pipe Line Co., Pan American Pipe Line Co., Tidewater Pipe Line Co., Nantucket Pipe Line Co., Phillips Pipe Line Co., and Ashland Pipe Line Co. with Shell Pipe Line Corp. handling construction and operation.

267 miles, contracted, McCamey to Cedar Valley near Austin, Tex. Anderson Bros. Corp.

190 miles, 24-in., contracted, Austin to Shell's Deer Park Refinery (Houston area).

64 miles, 24-in., under way, Deer Park refinery west to Brazos River. Oklahoma Pipe Line Constructors, contractor.

126 miles, 24-in., under way, Brazos River west to Austin. Houston Contracting Co.

Roosevelt Oil & Refining Corp.—21 miles, 4 and 6-in., authorized, St. Helens to Norwich, Mich.

Service Pipe Line Co.—29 miles, 10-in., planned, Saunders to Denton, N. M. Completion date 5-52.

33 miles, 16-in., planned, Bowie, Tex., to Drumright, Okla.

30 miles, 6-in., Knox and Haskell counties, Texas.

29 miles, 4, 6, 8-in., proposed, Natrona County, Wyoming.

Shell Pipe Line Corp.—42 miles, 8-in., authorized, Hallettsville to La Grange, Tex. Completion date 7-1-52.

Sinclair Pipe Line Co.—674 miles, 22, 24-in., under way, Drumright, Okla., to East Chicago, Ind. Completion date 1952.

Section 1—150 miles, 24-in., under way, Drumright-Cushing, Okla., area, to Humboldt, Kans. O. R. Burden Construction Co.

(Spread 1) 60 miles, 24-in., under way, Caney to Humboldt, Kans. A. B. Haynes, supt., at Chanute, Kans.

(Spread 2) 90 miles, 24-in., under way, Cushing, Okla., to Caney, Kans. Floyd Lewis spreadman at Hominy, Okla.

184 miles, 24-in., under way, Humboldt, Kans., to Salisbury, Missouri. R. H. Fulton & Co., contractor, M. L. Boyd and Jerry Nash, spreadmen.

Sterling Pipe Line System.—53 miles, 12-in., authorized, Sterling, Colo., to connection with Platte Pipe Line at Gurley, Neb. (includes 20 miles, 10-in., main line; 35 miles, 8-in., branch lines.) Joint venture comprising Toronto Pipe Line Co., Shell Pipe Line Corp., and Texas Pipe Line Co.

Sun Pipe Line Co.—99 miles, 4, 6, 8-in., proposed, Scurry County, Tex.

34 miles, 8-in., planned, Jameson to Colorado City, Tex.

13 miles, planned, Cogdell to Brice Island.

Texas Pipe Line Co.—319 miles, 22, 12, 10-in., under way, Louisiana Gulf Coast to Port Arthur, Tex., including 220 miles, 22-in., Houma, La., to Port Arthur, Tex.; 31 miles, 12¾-in., Houma to Cocodrie, La. Houston Contracting Corp. Completion date in summer 1952.

175 miles, 16-in., under way, Corsicana to East Houston. Smith Contracting Corp Frank Craig, spreadman at Teague, Tex. Completion early summer.

319 miles, 22, 12, 10-in., under way, Louisiana Gulf Coast to Port Arthur, Tex. Houston Contracting Co.

220 miles, 22-in., under way, Houma, La., to Port Arthur, Tex. Houston Contracting Co.

67 miles, 22-in., under way, Holmwood, La., west to Port Arthur, Tex. Houston Contracting Co., E. C. Norris, superintendent at Lake Charles, La.

67 miles, 22-in., under way, Holmwood east to Gueydan, La., and from Morgan City east to Houma. Houston Contracting. W. H. Hayes, superintendent, at Jennings, La.

86 miles, 22-in., under way, Gueydan east to Morgan City, La. Houston Contracting. F. A. Silar, superintendent, at Abbeville, La.

65 miles, 6, 8, 10-in., under way, and 30 miles, 12-in., Houma, La., south through Terrebonne Bay vicinity. Houston Contracting. H. L. Leake, superintendent, at Houma.

West Coast Pipeline Co.—986 miles, 20-22-in., planned, Snyder, Tex., to Norwalk, Calif.

West Texas Gulf Pipe Line Co.—471 miles, 26-in., contracted, Colorado City to Wortham, Tex., Wortham to Sour Lake, Tex., 24-in. Completion date 10-52.

114 miles, 20-in., contracted, Wortham to Longview, Tex. Completion date 10-53.

44 miles, 26-in., under way, Glenrose, Tex., area. Anderson Brothers, contractor.

120 miles, 26-in., contracted, East of Abilene, Tex. Associated Pipe Line Contractors, Inc.

60 miles, 26-in., contracted, Colorado City to Abilene, Tex. Anderson Bros. Corp.

94 miles, 26-in., contracted, West of Wortham, Tex. Anderson Bros.

Products Pipe Lines

Bell Oil & Gas Co.—150 miles, 6-in., planned, Ardmore to Drumright, Okla. (Includes 114 miles, 8-in., 32 miles, 6-in.) Completion date 6-1-53.

Buckeye Pipe Line Co.—370 miles, 8, 12, 16-in., authorized, Linden, N. J., via Allentown, Pa., to Auburn, Syracuse, Waterloo, and Rochester, N. Y. (Sections divided as follows: 75 miles, 16-in., 218 miles, 12-in., 77 miles, 8-in.). Completion of 16-in., 1952, balance 1953.

Coastal Products Pipe Line Co.—260 miles, 20-in., proposed, Houston to Baton Rouge.

Derby Oil Co.—30 miles, 4-in., under way, Wichita to Bell, Kans. Completion date 7-1-52.

Keystone Pipe Line Co.—60 miles, 12-in., proposed, Pt. Breeze, Pa., to Montello, Pa. Completion date 12-31-52.

Ohio Oil Co.—355 miles, 8, 10-in., proposed, East St. Louis, Ill., to Indianapolis.

24 miles, 8-in., authorized, East St. Louis to Wood River, Ill.

214 miles, 12-18-in., planned, Lima to East Sparta and Newark, Ohio.

Phillips Oil Co.—28 miles, 12-in., authorized. Sweeny to Freeport, Tex. Completion date 3-52.

Phillips Pipe Line Co.—42 miles, 10-in., under way, Green Ridge to Villa Ridge, Mo. Mid-States Const. Co. T. H. Edmonds, superintendent at Sedalia, Mo.

68 miles, 12¾-in., under way. Osawatomie westward to Wichita, Kans. Brown Lite Co. R. E. Carriker, spreadman at Osawatomie, Kans.

40 miles, 10-in., through Monteau, Cole, Osage, and Gasconade counties, Missouri, Trojan Const. Co. E. L. Maggard, spreadman at Linn, Mo.

Under way, Paloa, Kans.-Harrisonville, Mo. Smith Contracting Corp.

74 miles, 8-in., under way, looping from Decatur, Ill., to East Chicago, Ind. Somerville Const. Co., contractor.

137 miles, 10-in., authorized, looping from Paola, Kans., to East St. Louis, Ill.

Pioneer Pipe Line Co.—(Continental Pipe Line Co. and Sinclair Pipe Line Co.). 310 miles, 8-in., proposed, Sinclair, Wyo., to Salt Lake City, Utah.

Progress Pacific Pipe Line Co.—900 miles, 10-in., proposed, California to West Texas.

Salt Lake Pipe Line Co.—Proposed, Pasco, Wash., to Puget Sound.

330 miles, 8-in., planned, Salt Lake City, Utah to Boise, Idaho. Completion date 12-1-52.

Shell Oil Co.—565 miles, 8-14-in., planned, Wood River via East Chicago to Detroit; 35 miles, 14-in. Completion date summer of 1953.

Sinclair Pipe Line Co.—10-in., Houston to Baton Rouge; 16-in., Kalamazoo to Detroit; 20-in., Marcus Hook to Bayonne, N. J.; East Chicago to South Bend, Ind.

8-10-in., planned, Sinco to Port Arthur, Tex.

Standard Oil Co. (Ind.).—316 miles, 12-in., proposed. Sugar Creek refinery to Dubuque, Iowa. Completion date 1-1-53.

122 miles, 8-in., under way, Neodesha, Kans., to Belton, Mo. Bills & Troth Construction Co., Carl Bills, superintendent, at Armory Building, Neodesha. Completion date 1952.

Standard Oil Co. (Ohio).—17 miles, 6-in., authorized, Toledo to West Toledo, Ohio.

Sun Pipe Line Co.—110 miles, 8-in., under way, Fostoria to Hudson, Ohio.

Susquehanna Pipe Line Co.—123 miles, 6, 8-in., proposed, Fostoria to Randolph, Ohio.

Tuscarora Oil Co.—74 miles, 6-10-12-in., under way, Allentown to Midland, Pa.

United States Pipe Line Co.—1,000 miles, proposed, Gulf Coast via Memphis, Nashville, Tenn., Lexington, and Paducah, Ky., to Cincinnati, Ohio.

Natural-Gas Pipe Lines

Algonquin Gas Transmission Co.—140 miles, 24-26-in., under way, New Jersey to Connecticut River near New Haven. Williams Brothers, contractor. Robert L. Buck, project manager, Danbury, Conn. Spreadmen: Thelmer Davis, Waterbury, Conn., O. L. Martin, Sloatsburg, N. Y., O. R. Mitchell, Danville, N. J. Completion date 8-1-52.

253 miles, 24-26-in., under way, Lambertville, N. J., to Boston area. Williams Bros., contractor. Completion date 9-1-52.

270 miles, under way, New Jersey, Connecticut, Rhode Island, and Massachusetts. Completion date 9-1-52.

Allied Gas Co.—24 miles, 6⅝-in., proposed, McLean to Champaign County, Illinois.

Arkansas-Missouri Power Co.—140 miles, 2-10-in. planned, Arkansas and Missouri.

Associated Natural Gas Co.—88 miles, authorized, Missouri.

Carolina Natural Gas Corp.—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

Cities Service Gas Co.—179 miles, 4-30-in., gathering system in vicinity of Ulysses, Kans. Vaughn & Taylor Const. Co., Inc. D. D. Vaughn, spreadman, Ulysses.

21 miles, 26-in., proposed, Franklin and Anderson counties, Kansas.

15 miles, 20-in., Craig County, Oklahoma, to Lawrence County, Missouri.

Coast Counties Gas & Electric Co.—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

Colorado Interstate Gas Co.—220 miles, 20-in., under way, Kit Carson, Colo., to Amarillo, Tex. R. H. Fulton & Co., contractor. Jerry Nash, spreadman at Lamar, Colo.

Around a cooling tower or anywhere else you've got pipe to join, the handiest, surest way to get "Flexible-Tight" joints is with Dresser Couplings or Long Sleeves.

Dressers provide the "give and take" necessary to absorb vibration, settlement and other stresses. Specially compounded rubber gaskets permit up to 4° deflection at joints—yet with Dressers, these joints stay permanently tight.

The only tool you need is a wrench—no pipe threading is necessary. Any workman can install Dressers with ease.

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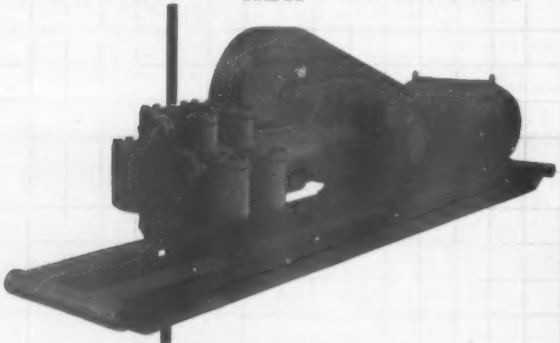
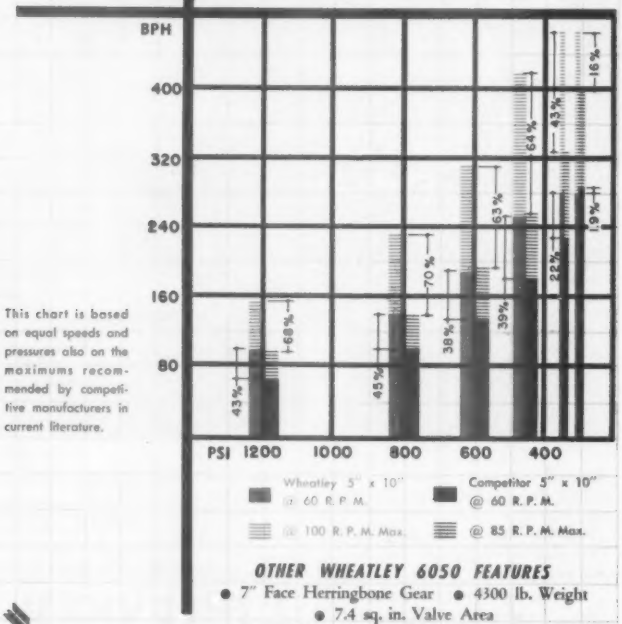
40% GREATER VOLUME!

FOR ONLY 10% ADDITIONAL INVESTMENT
WITH WHEATLEY'S **NEW** 5"X10" Series 6050





This chart is based on equal speeds and pressures also on the maximums recommended by competitive manufacturers in current literature.

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- 7" Face Herringbone Gear
- 4300 lb. Weight
- 7.4 sq. in. Valve Area
- Crank Pin 4" Diameter 3½" Base
- 8500 lb. Plunger Load
- Round Valve Covers
- 1½" Piston Rod Diameter
- Plus Three Decades of Engineering Design and Experience

FRANK WHEATLEY
PUMPS & VALVES
TULSA 6, OKLAHOMA

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16 miles, 4-in., Pueblo County to Fowler, Colo.

Commonwealth Natural Gas Corp.—537 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

Dow Chemical Co.—70 miles, various sizes. Midland, Saginaw, and Bay City, Mich. Mahoney Contracting Co., contractor. Ralph Bucher, spreadman at Midland.

East Tennessee Natural Gas Co.—172 miles, 22-in., authorized, Greenbrier to Oak Ridge, Tenn.

100 miles, 16-in., proposed, Knoxville to Kingsport, Tenn.

El Paso Natural Gas Co.—133 miles, 30-in., proposed, looping along main line in Texas, New Mexico, Arizona.

36 miles, 24-in., proposed, looping from Kingman to Franconia, Ariz.

Equitable Gas Co.—17 miles, 16-in., under way, near Pittsburgh, H. L. Gentry Const. Co., contractor. Lavern Curtis, spreadman at Sewickley, Pa.

Frederick Gas Co.—26 miles, 4-in., planned, Redlands to Frederick, Md.

Georgia Gas Co.—32 miles, 4½-in., proposed, Bogart to Gainesville, Ga.

Glacier Gas Co.—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Grand Valley Pipe Line Co.—106 miles, 8-10-in., planned, Piceance Creek field to Rifle on to Grand Junction, Colo.

Gulf Interstate Gas Co.—1,000 miles, 30-in., planned, Gulf Coast to North Kentucky.

Home Gas Co.—32 miles, 12-in. authorized, Breesport to Union Center, N. Y.

17 miles, 12-in., proposed, loops from Hancock to Sanford, N. Y.

Hope Natural Gas Co.—33 miles, 8-10-12-in., planned, Wyoming County, West Virginia, south to Buchanan County, Virginia.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., authorized, Washington County to Cedar Rapids, Iowa.

¾ to 6-in., under way, Davenport, Iowa, and Moline, Ill. C. E. Wilson Const. Co.

Kansas-Nebraska Natural Gas Co., Inc.—179 miles, proposed, Kansas and Nebraska.

20 miles, 16-12-in., planned, Hastings to Grand Island, Neb. Completed date 1952.

18 miles, 6-8-in., planned, McCook Neb., south. Completion date 1952.

54 miles, 4-6-in., planned, Neligh to Hartington, Neb. Completion date 1953.

49 miles, 10-in., planned, Ogallala to North Platte, Neb. Completion date 1952.

20 miles, 12-in., planned, Atwood to near Oakley, Kans. Completion date 1952.

Kansas Power & Light Co.—27 miles, 20-in., authorized. Pratt, Kans., to Calista compressor station.

28 miles, 12-16-in., planned, north of Kansas to Meade County Gas Field.

Lake Shore Pipe Line Co.—45 miles, 10¾-in., authorized, northwesterly from T.G.T. system near Meadville, Pa., to Ashtabula, Ohio.

Lone Star Gas Co.—100 miles, proposed, storage fields to the Dallas-Fort Worth area. 35 miles, 12-in., proposed, southeastern Schleicher County.

Manufacturers Gas Light & Heat Co.—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

Michigan Gas Storage Co.—93 miles, 16, 22, 24-in., under way, Laingsburg to near Pontiac and Mount Clemens, Mich. (Includes 17 miles of lateral lines.) Mahoney Contractor. Completion date 6-52.

30 miles, 26-in., authorized, looping between Laingsburg and Mount Pleasant Junction, Mich.

Michigan Gas Utilities Co.—77 miles, under way, Sturgis, Hillsdale, and Coldwater, Mich. (32.7 miles, Marshall south to Coldwater; 20 miles, Coldwater easterly to Hillsdale; 22.5 miles, Hillsdale to Sturgis, 11 miles, Hillsdale to Jonesville.) Somerville Const., contractor, Jim Godwin at Coldwater.

MidSouth Gas Co.—240 miles, proposed, Greene, Poinsett, Crittenden, St. Francis,

Lee, Phillips, Monroe, Woodruff, and Cross counties, Arkansas.

Minneapolis Light & Power Co.—20 miles, 30-in., under way, Minneapolis, Williams Bros., contractor. F. W. Caldwell, spreadman.

Mississippi River Fuel Corp.—98 miles, 16- and 18-in., authorized, feeder line from Lincoln Parish, Louisiana, to Waskom field, Harrison County, Texas.

40 miles, 18-in., authorized, Dubach to Perryville, La.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

Montana Power Co.—52 miles, 16-in., authorized, Canada-Montana border to Cut Bank, Mont.

Morganfield Natural Gas Co.—31 miles, 4-6-in., proposed, through Sturgis, Providence, Clay, Diamond, Wheatcroft, and Sullivan, Ky.

National Utilities Co. of Michigan.—76.7 miles, 20-in., proposed, South Central Michigan. (22 miles from near Marshall south to Coldwater; 20 miles east to Hillsdale; 22 miles southwest to Sturgis; 5 miles from Hillsdale to Jonesville and 8 miles west to Union City.)

Nevada Natural Gas Pipe Line Co.—114 miles, 10-in., proposed, Topock, Ariz., to Las Vegas, Nev.

New River Gas Co.—50 miles, planned, Summers to Monroe counties, West Virginia to Narrows and Dublin, W. Va.

New York State Natural Gas Corp.—104 miles, 14, 16, 20-in., authorized, looping on Westmoreland, Armstrong, and Tioga counties, Pennsylvania. (Includes 17 miles, 16-in., in Potter County, Pennsylvania, and 21 miles 14-in., replacement in Line No. 507, New York.)

13 miles, 20-in., under way, looping at Zelienople, Penn. Williams-Austin Co. Ralph Gaddy, supt. 5-15-52.

53 miles, 16-in., contracted, Utica to Amsterdam, N. Y. (to begin at completion of Zelienople). Williams Austin. Ralph Gaddy, supt. Completion in 90 days.

20 miles, 20-in., begin 5-1, Cayuta Gate to Ithaca, N. Y. Williams-Austin Co. Howard Bauer, supt. Completion date 6-30-52.

30 miles, 20-in., contracted, Angelica to Rossburg, N. Y. (begin at completion of Cayuta-Ithaca). Williams-Austin. Howard Bauer, supt. Completion in 45 days.

17 miles, 16-in., contracted, Colesburg Junction to Sabinsville, Pa. (begin at completion of Angelica job). Williams-Austin. Howard Bauer, supt.

21 miles, Columbiana and Stark counties, Ohio.

Niagara Mohawk Power Corp.—55 miles, 10-in., Fulton to Watertown, N. Y.; Williams-Austin Co., contractor, Howard Bauer, supt. Completion date 9-52.

Northeastern Gas Transmission Co.—221 miles, 20-24-in., authorized, New Hampshire, Massachusetts, and Connecticut.

Northeastern Gas Co.—411 miles, proposed, New England towns.

Northern Natural Gas Co.—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

210 miles, 26-in., proposed, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

400 miles, 24-in., proposed, Emerson, Manitoba south to Red River Valley through Fergus Falls on to St. Paul, Minn.

Northern Indiana Fuel & Light Co.—33 miles, 8-in., proposed, Edgerton to Auburn, Ind.

Northwest Natural Gas Co.—750 miles, planned, Washington, Oregon, and Idaho.

373 miles, 24-in., proposed, Eastport, Idaho, to Monroe, Wash.

79 miles, 18-in., proposed, Monroe to International boundary near Lynden, Wash.

29 miles, 22-in., proposed, Monroe to near Seattle, Wash.

164 miles, 20-in., proposed, Seattle to Portland, Ore.

Ohio Fuel Gas Co.—31 miles, 20-in. authorized, Licking County to Richland County, Ohio.

22 miles, 16-in., authorized, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., authorized, Wellington to Elyria, Ohio; 16 miles, 20-in., authorized, Benton Station to Crawford Station. 18 miles, 20-in., Crawford Station to near Columbus. 16 miles, 16-in., authorized, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., authorized, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., authorized, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, authorized, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

Pacific Gas & Electric Co.—44 miles, 8-in. under way, Salinas to King City, Calif. W. M. Lyles and company crews. Completion date 6-10-52.

141 miles, 34-in., proposed, parallel sections along Topock-Milpitas line.

10 miles, 10-12-in., authorized, Monterey to Fort Ord to Castroville; 12 miles, 16-in., Napa Wye to Shellville; 6 miles, 12-in., Cotati to Santa Rosa, Calif.

Pacific Northwest Pipeline Corp.—26-in. Alberta fields through to Pincher Creek, Spokane, Hanford, Vancouver, and Portland.

Panhandle Eastern Pipe Line Co.—70 miles, 24-26-in., under way, looping from Sneed, Tex., to Emporia, Kans.

174 miles, 20 and 26-in., contracted. Tuscola, Ill., eastward—looping present system; R. A. Conyes, contractor.

44 miles, 26-in., Edgerton, Mich., Anderson Bros.

22 miles, 30-in., looping in Tuscola, Ill.

45 miles, 30-in., looping in Montezuma, Ind.

63 miles, 30-in., looping in Zionsville, Ind.

Pennsylvanian Gas Co.—52 miles, 12-in., between Warren and Erie, Pa. Section 1—27 miles, under way and contracted by Harford Bros. Section 2—25 miles.

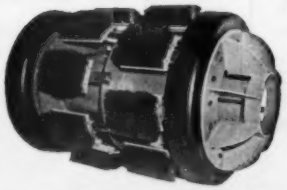
Peoples Natural Gas Co.—25 miles, proposed, Cambria and Blair counties, Pennsylvania.

Permian Basin Pipeline Co.—394 miles, 20-30-in., proposed, Permian Basin area to eastern New Mexico.

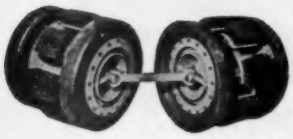
139 miles, planned, Upton County, Texas, to Lea County, New Mexico.

THE PIG WITH THE POKE — CLEANS PIPE LINES

MORE CUBIC FEET PER DAY... THROUGH NATURAL GAS LINES CLEANED by WILLIAMSON PIGS



GP-2 16"-30"
Similar design 10" to 14" sizes. Will traverse all standard pipe-line gate valves and field bends of approx. 12 ft. radius.



GP-3 18"-30"
Similar design 10" to 16" sizes. Will traverse long-radius welding ells up to 90° lengths. Also through port and many conventional gate valves.

WC-12 6"-14"
Will traverse all standard pipe-line gate valves and field bends.

Other designs for sizes smaller than 6"

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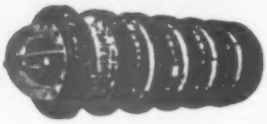
EXPANSIBLE INTERNAL PIPELINE CLEANER

DESIGNED AND PROVEN BY PIPELINE MEN



All sizes 6" to 30"

UNLESS YOU ARE USING THE EXPANSIBLE CLEANING MACHINE, YOUR LINES ARE NOT BEING THOROUGHLY CLEANED.

EXPANDS for constant pressure on all sides. Compensates for brush wear.

FLEXIBLE to eliminate stoppage on bends, drops, etc. Can traverse 90° 1½ radius tube turns.

EFFICIENT cleaning pays off in increased gas volume.

CLEANER PIPELINES CO.
1900 Armour Rd. No. K. C. 16, Mo.

76 miles, planned, Lea County to Roosevelt County, New Mexico.

169 miles, planned, Roosevelt County, New Mexico, to Carson County, Texas.

Phillips Petroleum Co.—118 miles, 3-22-in., under way, Sherman and Hansford counties, Texas, gas-gathering system; Vaughn & Taylor Construction Co., Inc., Dumas, Tex., J. F. Crawford, spreadman at Texhoma, Okla.

Prince George's Gas Corp.—20 miles, 22-in., authorized, between Chillum and Rockville, Md.

Public Service Co. of Colorado.—95 miles, proposed, Douglas Creek and other gas fields to Grand Junction, Colo., area.

Public Service Co. of North Carolina.—33 miles, 10-in., authorized, Burlington to Chapel Hill, N. C.

16 miles, 8-in., authorized, Chapel Hill to Raleigh, N. C., completion date 7-1-52.

29 miles, 4-in., authorized, Statesville to Kanapolis, N. C., completion date 7-1-52.

83 miles, 8-in., authorized, Kings Mountain to Asheville, N. C., completion date 3-1-53.

Rockland Light & Power Co.—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

South Georgia Natural Gas Co.—339 miles, 2-12-in., proposed, Florida and Georgia.

Southern California Gas Co.—35 miles, planned, Antelope Valley, California.

Southern California Gas Co. and Southern Counties Gas Co. of California.—45 miles, 30 in., proposed, looping on line from Arizona border to Los Angeles.

81 miles, 30-in., proposed, Whitewater to Desert Center, Calif.

Southern Natural Gas Co.—21 miles, 24-in., authorized, Perryville Station La., to Boeuf River.

14 miles, 24-in., authorized, Onward Station, Miss., to Big Sunflower River.

14 miles, 14-in., authorized, Perryville Station, La., to Wilhite Gate.

375 miles, 24-in., planned, Gwinville, Miss., to Atlanta, Ga.

169 miles, proposed loops, Ouachita Parish, Louisiana, to Augusta, Ga.; 20 miles in Ouachita Parish, 33 miles in Ouachita and West Carroll parishes; 7 miles, Sharkey County, Mississippi; and 158 miles, 14-in., Bass Junction to Augusta, Ga.

Southern Union Gas Co.—21 miles, 20-in., authorized, Albuquerque, N. M.

27 miles, 10-in., authorized, Lea and Eddy counties, New Mexico.

30 miles, 12-20-in., contracted, San Juan County, New Mexico. R. H. Fulton & Co.

Southwest Gas Corp., Ltd.—36 miles, proposed, from P.G.&E. line to Victorville, Calif.

Tennessee Gas Transmission Co.—591 miles, 24-30-in., proposed, looping along present system (consisting of 323 miles of 30-in.; 167 miles of 26-in.; 101 miles of 24-in.)

420 miles, 30-in., Texas, Louisiana, Arkansas, Mississippi, Tennessee, and Kentucky.

101 miles, 26-in., Kentucky and Ohio.

304 miles, 24-in., proposed, Mercer, Pa., to Utica, N. Y.

250 miles, miscellaneous laterals.

80 miles, 26-in., contracted, Harrison County to Jackson County, Ohio. H. C. Price Co., contractor.

24 miles, 26-in., contracted, Carrollton, Ohio, southwestward to Harrison County, Ohio. H. C. Price, contractor.

56 miles, 26-in., contracted, Athens, Ohio, to Jackson County, Ohio. H. C. Price Co., contractor.

Texas Eastern Transmission Corp.—791 miles, 30-in., under way, Kosciusko, Miss., to Connellsville, Pa.

Section 8, 77 miles, 30-in., under way, Portsmouth to Amesville, Ohio. Anderson Bros. Corp.

Section 9, 74 miles, 30-in., under way, Amesville to Ohio-West Virginia river crossing. Anderson Bros. Corp.

Section 10, 66 miles, 30-in., under way, Ohio River to Connellsville, Pa. Anderson Bros Corp.

315 miles, 24-in., proposed, Provident City, Tex., to Castor, La.

Texas Gas Transmission Corp.—408 miles,

H&M

PIPE CUTTING AND BEVELING MACHINE

Cuts and Bevels Pipe FASTER, MORE ECONOMICALLY

Split horseshoe shaped gear permits machine to slip quickly over pipe. Fast operating snap chain fasteners hold it in place. A complete cut and bevel can be made in a 12 inch pipe in about two minutes.

You'll soon save several times the cost of the machine in labor, gas and transportation charges. H&M takes approximately one-half the labor and gas to make the cut as hand cutting and the work is all done in the field.

Bring this light (24 to 155 pounds) but durable machine to the pipe instead of moving the heavy pipe to the machine. Remember, H&M designs for SPEED and ECONOMY.

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311 E. 3rd St. Tulsa, ...
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Trade Mark Reg. U. S. Pat. Off.

26-in., proposed, looping from Bastrop to Hardinsburg, Ky.

223 miles, 26-in., proposed, Bastrop, La., to Covington, Tenn.

47 miles, 26-in., proposed, northeastward from Covington.

49 miles, 26-in., proposed, northeastward from Kenton, Tenn.

45 miles, 26-in., proposed, northeastward from Calvert City, Ky.

25 miles, 26-in. proposed, northeastward from Slaughters, Ky.

19 miles, 26-in., proposed, southwestward from Jeffersontown, Ky.

180 miles, 26-in., authorized, Acadia Parish to connection with existing facilities in Morehouse Parish.

35 miles, 12-in., authorized, Slaughters, Ky., to Evansville, Ind.

195 miles, 26-in., proposed, Gulf Coast region to southwestern Louisiana.

560 miles, 26-in., proposed, Louisiana and Kentucky.

Texas-Ohio Gas Co.—1,350 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va. Completion date 8-30-53.

Union Oil Co. of California.—40 miles, 8-10-in., planned, San Joaquin Valley and Los Angeles basin.

United Fuel Gas Co.—32 miles, 20-in., under way, Lanham to Broad Run, W. Va. H. L. Gentry Construction Co., contractor. Frank Morris, spreadman at Charleston, W. Va.

United Gas Pipe Line Corp.—315 miles, 24-30-in., under way, Agua Dulce to near Goodrich, Tex. Oklahoma Contracting Co., contractor. Panama Shiflett, spreadman, El Campo, Tex.; Ray Law, spreadman, Victoria, Tex.

510 miles, 20 to 30-in., under way, Agua Dulce, Tex., to Monroe, La. River Const. Corp., contractor.

Spread 1, 51 miles, 30-in., from Pearl River north and south of Jackson, Miss. Red Tatom, superintendent at Jackson.

Spread 2, 45 miles, 30-in., McComb to Pearl River south of Jackson. Merle Tatom, superintendent at Hazelhurst.

Spread 3, 30 miles, 30-in., Kosciusko south toward Jackson. Jimmy Reed, superintendent at Kosciusko.

Spread 4, 29 miles, 12-in., Lafayette to Jeanerette, La. Roy Earnhart, spreadman at Jeanerette.

124 miles, Sterlington compressor station, near Monroe to Jackson, Miss.

23 miles, 8-12-16-in., South Louisiana facilities.

53 miles, 24-in., authorized, Texas.

36 miles, proposed, offshore from Ingleside to near Refugio, Tex.

All contracted by River Const. Corp., a joint venture including Oklahoma Contracting Co.; J. Ray McDermott & Co., Inc., and Morrison-Knudson. Inspection by Brown & Root, Inc.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Western Kentucky Gas Co.—2 to 4-in., under way, additions to present system; Modern Welding Co., Inc., contractor.

Western Pipe Lines.—1,200 miles, 22-in., planned, southern Alberta to Duluth, Minn.

West Texas Gas Co.—27 miles, 10-in., authorized, Lubbock to Abernathy, Tex.

Wilcox Trend Pipe Line Co. (Harry Bass Drlg. Co.)—150 miles, various up to 20-in., planned, gathering system for delivery to proposed Texas Eastern terminal at Provident City, Tex.

Foreign Crude-Oil Pipe Lines—Planned and Under Way

Alberta-Vancouver Oil Pipe Line Co.—(Brokaw, Dixon, McKee).—972 miles, 16-in. proposed, Edmonton via Pincher Creek Alta., Idaho and Washington states to Vancouver, B. C.

Cia. de Petroleo Ganso Azul, Ltd.—48 miles, 4-in., planned, Ganso Azul field to Pucalpa on upper Ucayali River, Peru.

Condor.—90 miles, 12-in., under way, Genoa to Rho, near Milan, Italy. Soc. Ital. Condotte Acqua Montubi, contractor. Completion date 7-31-52.

Creole Petroleum Corp.—143 miles, 26-in. under way, Ule (State of Zulia) to Amuay (State of Falcon). Williams Bros. de Venezuela, S. A., contractor of overland sections. Charles Williams, manager; Marvin Jones, general superintendent, Maracaibo. McWilliams, Gahagan, and Anderson Bros., contractors of water crossings. Completion date March 1953.

25 miles, 34-in., authorized, Lagunillas to La Salina (State of Zulia). Completion date April 1953.

Direccion General de Yacimientos Petroliferos Fiscales.—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

Interprovincial Pipe Line Co.—100 miles, 16-in., contracted, Regina, Sask., to Gretna, Man., Canada. Anderson International Contractors, Ltd.

Iraq Government.—135 miles, 12-in., proposed, from Iraq Petroleum Co. at Baija to Baghdad, Iraq. Construction 1952, M. W. Kellogg, contractor.

73 miles, 12¾-in., Zubair to Fao. Arabian Bechtel Co., contractor.

Mene Grande Oil Co.—30 miles, 26-in., under way, Anaco to Puerto La Cruz. Chicago Bridge & Iron Co., contractor.

32 miles, 26-in., authorized, Anaco to Puerto La Cruz.

Middle East Pipelines, Ltd.—800 miles, 34-35-in., planned, Iran to a Levantine port.

Petroleos Mexicanos.—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

Socony-Vacuum Oil Co., Inc.—30 miles, 8-10-in., under way, Hutchinson, Kans. Brown-Lite Contractor.

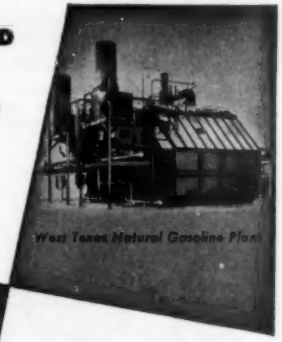
Spitz & O'Berine.—264 miles, 24-in., under way, Capetown to Tarrytown, South Africa. J. C. Spitzexplari, spreadman at Capetown.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pto, Nino to La Dorada.

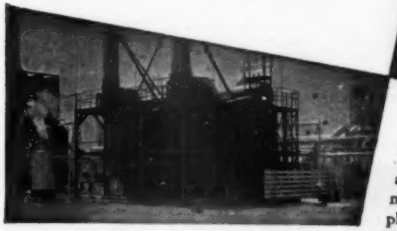
Trans-Mountain Oil Pipe Line Co.—639 miles, 24-in., proposed, Edmonton, Alta., to

WICKES

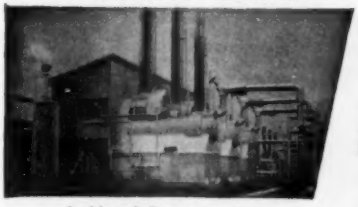
STEAM GENERATORS SPEED PROCESSING AND CUT COSTS IN REFINERIES AND NATURAL GASOLINE PLANTS



West Texas Natural Gasoline Plant



Central Texas Natural Gasoline Plant



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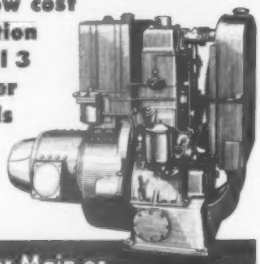

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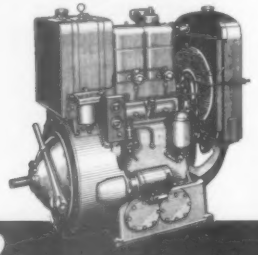
• Nordberg 1, 2 and 3-cylinder Diesel Generator Sets produce from 6 to 30 kilowatts. These sturdy, reliable units are ideal for providing main or standby electric power for almost every need.



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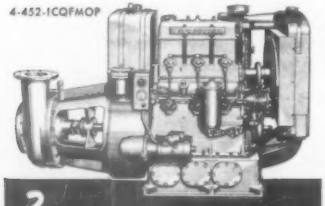

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BUILDERS OF AMERICA'S LARGEST LINE OF HEAVY DUTY DIESELS

Vancouver, B. C. Canadian Bechtel, Ltd., engineers.

221 miles, 24-in., contracted, center section of line, Mannix, Ltd.

472 miles, 24-in., contracted, Western section of line, Comstock Midwestern, Ltd.

Foreign Products Pipe Lines—Planned and Under Way

Colombia Ministry of Petroleum.—90 miles 8-in., planned, Puerto Berrio to La Dorada Colombia.

113 miles, 6-in., contracted, Puerto Berrio to Acededo near Medellin, Colombia. Carolina Construction Co.

75 miles, 4-in., planned, Buena Ventura to Cali, Colombia.

Empresa de Ferrocarriles Ecuatorianos.—50 miles, 6-in., contracted, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor: C.R.C. Engineering Co., engineers.

Estrada de Ferro Santos a Jundiai.—32 miles, 18-in., under way, Santos to Sao Paulo, Brazil ((fuel oil line); Techint, contractor. Completion date 7-52.

Governments of Southern Rhodesia and Portuguese East Africa.—200 miles, considered, Beria, Portuguese Mozambique to Umtali, Southern Rhodesia.

Imperial Oil Co., Ltd.—170 miles, 10-12-in., under way, Hamilton to Toronto, Ont., Canada, Comstock-Midwestern, Ltd., contractor. Completion date July 1952.

Petrocongo (Sub. Cie. Financiere Belge des Petroles, S.A.).—225 miles, considered, Ango-Ango to Leopoldville, Belgian Congo.

Societe des Transports Petroliers par Pipe Line.—140 miles, 10-in., under way, Le Havre to Paris, Fance. Entrepose, contractor. Completion date 1952.

State of Cundinamarca, Colombia.—120 miles, 6-in., Puerto Salgar to Bogota, Colombia; Williams Brothers Co.; David Louthen, manager, Bogota.

Trans-Northern Pipe Line Co.—440 miles, under way, Hamilton, Ont., to Toronto, Ont., to Montreal, Que., Canada.

Foreign Natural-Gas Pipe Lines—Planned and Under Way

Azienda Generale Italiana Petroli.—110 miles, 12-14-16-in., planned, Cortemaggiore to Genoa.

145 miles, 14-16-in., under way, Cortemaggorie to Torino. Completion date 1951.

Canadian Delhi Oil Co. (Subsidiary Delhi Oil Co.).—2,132 miles, proposed, Alberta, Toronto, Montreal.

Direccion General del Gas del Estado.—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

Northwest Natural Gas Co.—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos.—205 miles, 16-in., considered, Monterrey to Torreon, Mexico.

260 miles, 20-in., under way, Monterrey to Tampico and Poza Rica, Mexico.

Petroleos Mexicanos, Mexican Gas Co., and Industrial Gas Co.—600 miles, planned, Reynosa, Tamaulipas, to Tampico-Poza Rica, Mexico.

Trans-Canada Pipe Lines, Ltd.—Proposed, Alberta to Toronto to Montreal.

Venezuela Atlantic Transmission Corp.—195 miles, 10-12-16-in., under way, El Placer near Las Mercedes, State of Guarico to Caracas, La Guaria, Maracay, and Valencia. Contracted by Williams Brothers, de Venezuela, S.A., B. E. Barnes, manager.

Westcoast Transmission Co., Ltd.—1,110 miles, 24-in., planned, Dawson Creek, B. C., through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon & Davis, engineers.

280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon & Davis, engineers.

138 miles, 20-in., planned, Sumas to Tacoma, Wash.

139 miles, 18-in., planned, Tacoma, Wash., to Portland, Ore.

Western Pipe Lines.—1,033 miles, 24-in., proposed, from southern Alberta, eastward across the Canadian prairies, serving principal towns and cities along the route to a point near the International boundary.

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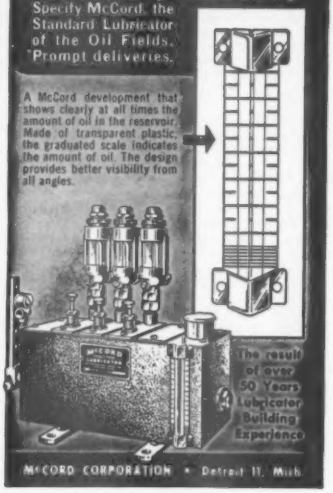
The new improved "SF" Lubricator is an outstanding lubricator, engineered to deliver metered quantities of oil under pressure to cylinders or bearings. Specify McCord, the Standard Lubricator of the Oil Fields. Prompt deliveries.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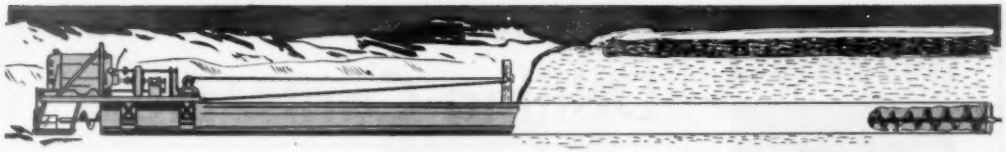

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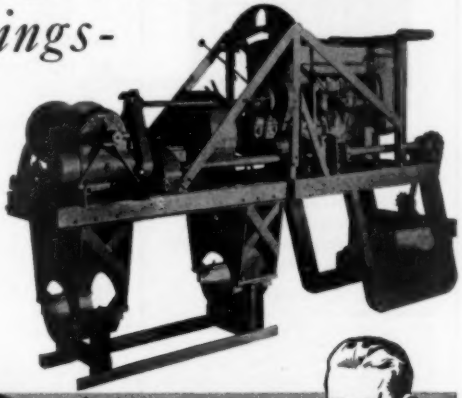

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For Ducting, Fuel, Hydraulic or Air Lines and Wiring Assemblies

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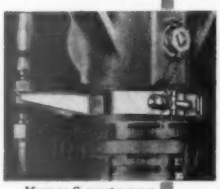

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Marman Supports are light, strong, and corrosion-resistant. They provide secure mountings that allow for quick assembly or disassembly, yet hold tight under conditions of stress or vibration. Lugs, clips or brackets can be attached to Marman Clamps to make Supports which will hold hydraulic lines, wiring, etc.

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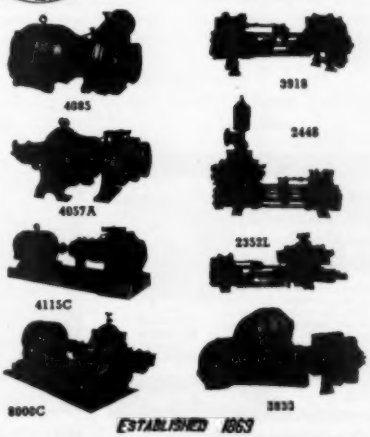

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STANDCO BRAKE LINING

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Among the
Drilling Contractors

Delta Rigs Drilling At 15 Operations

Delta Drilling Co. and its affiliated company, Delta Gulf Drilling Co., Tyler, Tex., report 15 operations currently under way, including nine partnership and six outside contract tests.

The former company's outside jobs include a wildcat test being drilled for Texas Eastern Producing Co. in the Reklaw area, Cherokee County, East Texas; a 12,500-ft. test for Shell Oil Co. in the new Ginger area, Rains County, also in East Texas; and a 11,000-ft. test for Spartan Drilling Co. on the latter's Dad unit, in Carbon County, Wyoming. On partnership tests, it has two rigs working in the Bradford area, western Pennsylvania; one each in the Rosborough field, Harrison County, East Texas, Pickton field; Rains County, also East Texas; Weddell field, Sterling County, West Texas; and Clear Creek area, Dawson County, Montana.

Delta Gulf's outside jobs include a 9,000-ft. well for Sohio Petroleum Co. in the Elmore area, Garvin County, Oklahoma; a 11,500-ft. well for Sinclair Oil & Gas Co. in the Hobbs area, Lea County, New Mexico; and another deep well for Humble Oil & Refining Co. in the Bayou Chene field, St. Martin Parish, coastal Louisiana. On its own or partnership tests, it has a rig working in the Hulldale field, Schleicher County, Texas, where it has completed nine producing wells to date; another on a 12,000-ft. wildcat project in Crockett County, West Texas; and the third in Stonewall County, Texas.

Parker Drilling Co., Tulsa, is moving a large diesel-electric rig from the Elk City field, Beckham and Washita County, Oklahoma, to a wildcat location in northern Custer County, same state, where it will drill a projected 12,500-ft. test for N. B. Hunt of Dallas. The new operation is 1 Miller, C NE SW 22-15n-16w. Location is 13 miles northeast of Arapahoe.

Crescent Drilling Co., Monroe, La., contracting for Southern Carbon Co., is starting a deep exploratory test in the old Monroe gas field, northeastern Louisiana. Location, 1-D Ladel, is at Fairbanks, Ouachita Parish. Hole is projected to 10,500 ft. Old dry gas production in the area is from the shallow Gas Rock zone.

ACTIVE ROTARY RIGS*
(United States and Western Canada)

Area—	Week ended 5-26-52	Change week ended 5-19-52	Change week ended 5-28-51
Gulf Coast	634	− 7	+ 67
N. & W. Tex.-N. M.	1,005	−10	+122
Ark.-N. La.-E. Tex.	145	+ 3	− 8
Oklahoma	312	−38	+ 56
Kansas-S. Nebraska	171	+ 8	+ 36
Illinois-Eastern	150	+ 4	− 7
Rocky Mountains	229	+10	+ 87
Pacific Coast	165	+ 3	+ 15
Total U. S.	2,811	−27	+368
Western Canada	183	+ 3	+ 48
Total	2,994	−24	+416

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the North and West Texas-New Mexico and Oklahoma-Kansas areas are shown on pages 158 and 159.

SERVICE RECOGNITION.—Four employes in the Pacific Coast division of Loffland Brothers Co. received 25-year service awards at a recent company party at Newhall, Calif. They were A. H. Holder, general field superintendent, and P. C. Peterson, Phil Burbank, and Jim Jones, tool pushers. Awards were presented by R. W. Wire, president, assisted by B. B. Smith, executive vice president, both of Tulsa, and John Grant, vice president of the Pacific Coast division. In the picture, left to right, are: Smith, Holder, Peterson, Wire, Burbank, and Grant. Jones was not present.

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This dependable trouble-shooter has gained a wide reputation for "outstanding service in the line of duty." It easily recovers junk of every description . . . and here's why:

Its long, narrow teeth taper toward the inside, and while digging, guide the junk to the center of the opening so it easily can be forced up into the barrel. Once in the barrel, or even partly so, the strong catcher dogs hold it securely for the trip out of the well. Also, the barrel has an extremely large capacity, carries a big load, and requires a minimum number of round trips to recover a given amount of material . . . makes tough jobs look easy.

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H & H Drilling Co., Wichita, Kans.

FIVE years old May 28, H & H Drilling Co. now is one of Kansas' most successful and active drilling firms. Main office is at Wichita, and its field operations center at Great Bend.

Personnel . . . Organizers and present owners are W. L. Hartman and R. E. Hartman, his son, headquartering at Wichita. O. C. Arnott, working out of Great Bend, is tool pusher and supervisor of drilling operations.

Drilling equipment . . . The company currently is operating three rotary rigs, ranging from 3,500 to 6,500 ft. in rated depth capacities. It also operates three cable-tool rigs, which can be used either for well-completion work, or shallow drilling.

Drilling scope . . . Operations to date have been confined largely to western Kansas and southern Nebraska, due to the abundance of work in that region.

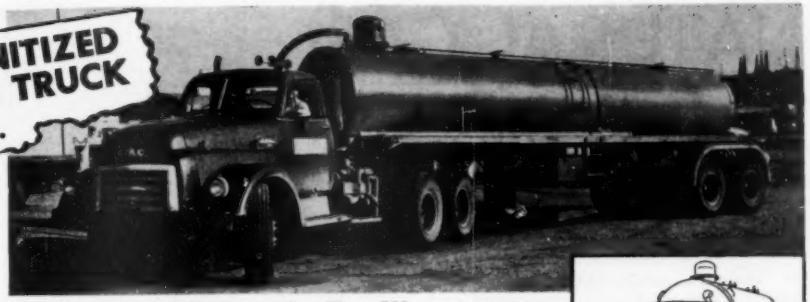
Achievement . . . Eighty wells, totaling 211,042 ft. of hole, were drilled in 1951. Eight of the wells were completed as oil discoveries, including four new pool-openers, three which proved new pay zones in existing fields, and one which revived production in an old field. In number of oil discoveries in Kansas, it tied for first place.

Other activities . . . In addition to contract operations, the company drilled many wells for its own account. Owners of the company operate a number of good producing properties of their own.

Wade Drilling Co. is the contractor on a projected 6,500-ft. wildcat test which Sunny Valley Oil Co. is drilling in the Ute Creek area, Costilla County, Colorado. The new operation is on the Blanco-Trinchera ranch, with location in the C NW SW 2-30n-72w.

H. L. Rowley, Inc., Shreveport, contractor on Sinclair Oil & Gas Co.'s recently abandoned wildcat test in Coconino County, Arizona, is moving its rig to a new location in the Cow Springs area of Navajo County, same state, where it has a contract with the same company for another test to the granite, expected around 7,000 ft.

387th UNITIZED VACUUM TRUCK ROLLS . . .



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Oil & Gas Journal
Mar. 31, '52

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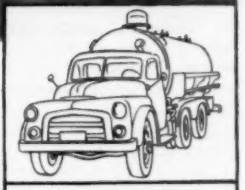

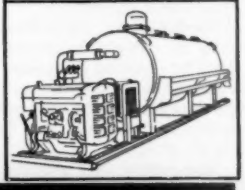

Drilling
- ☐ Transfer Rotary Mud
- ☐ Remove Brine
- ☐ Clean Tanks
- ☐ Agitate Mud
- ☐ Transfer Acids, Acid Sludge and Caustics

Refining
- ☐ Clean Tanks
- ☐ Clean Drain Boxes
- ☐ Unplug Drain Lines
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NATURAL GAS

More Consumers

1,514,000 householeaters added in 1951-52 season

NEW YORK.—The gas-utility industry added 1,514,000 new domestic customers during the 1951-52 heating season to score a resounding 50 per cent increase over the number added during the preceding heating season.

The increase raises the industry's composite gas-householeating saturation to 44.7 per cent, the American Gas Association reports.

Estimates by the association's bureau of statistics based on data supplied by reporting companies place new customers to be added during the 1952-53 season at 1,079,000, the 1953-54 season at 1,084,000, and the 1954-55 season at 1,057,000.

The reports were received from 295 companies serving 21,600,000 residential customers or about 91.5 per cent of the total. Estimated gains are based on expected gradual modifications of heating restrictions imposed by the Petroleum Administration for Defense.

Restrictions . . . PAD Order No. 2, issued in August 1951, limited new natural-gas heating installations in certain areas. Utilities affected by the order were permitted to add new heating customers to the extent of 1 per cent of total gas customers annually.

Two general exceptions were incorporated into the order. One of these allowed communities that had recently converted to natural to accept up to 10 per cent of total gas customers as users of gas heat during the first 2 years after conversion. Under the other exception, in communities where no gas service had previously been available or in which fewer than 5,000 customers had received manufactured gas, no limitations were imposed.

The order was effective in 15 states and the District of Columbia. An amendment to the Defense Production Act permitted this order to be set aside in states where the public regulatory body certified that it would assume responsibility for gas supply. To date eight states have done this.

FPC Studying Reactions to Proposed Gas Act Changes

WASHINGTON.—The Federal Power Commission has issued a supplemental notice of proposed rule making which would amend the regulations under the Natural Gas Act relating to the form and filing of applications for certificates of public convenience and necessity.

The proposed changes are generally designed to help eliminate sketchy and incomplete applications, which require extensive correspondence to supply deficiencies.

They would place upon the applicant the burden of adequate presentation of certificate applications; provide for the filing of abbreviated applications in the case of relatively minor operations, sales, service, construction, extensions, or acquisitions; and provide general improvement in the form and content of applications.

FPC now is considering views and comments on the amendments which were submitted in writing up to May 29 preparatory to taking any action.

Wulff Agrees to Farm Out Its New Acetylene Process

LOS ANGELES. — Wulff Process Co. has entered into agreements with Lummus Co., of New York, Fluor Corp., Ltd., of Los Angeles, and Girdler Corp., of Louisville, under which these latter companies may design and construct plants using the Wulff process for making acetylene and ethylene.

The process uses natural gas, ethane, propane, butane, or any L.P.G. mixture as feed stock and produces low-cost acetylene. According to Wulff, it may be applied to plants making as little as 1 ton per day or as much as 100 tons daily.

Wulff has been operating a commercial-size pilot plant in Maywood, Calif., for the past 18 months. During the past 9 months the plant has been in continuous commercial production of acetylene.

United Natural to Lay Out $1,311,520 for Storage

OIL CITY, Pa.—United Natural Gas Co. has allotted $1,311,520 this year for expansion and improvement of its underground-storage facilities.

New expenditures, which will bring the company's outlay for underground storage since 1946 to nearly $4,000,000, will go principally for new high-pressure transmission lines and some increased horsepower at compressor stations.

Howard S. Rose, United's president, said the company's deliverability from underground storage at the beginning of last winter was 117,000,000 cu. ft. per day. This will be expanded within the next few years to about 155,000,000 cu. ft. per day.

Busting Ground at Ventura

Taking part in recent ground-breaking ceremonies for Shell Chemical Corp.'s new multimillion-dollar ammonia plant at Ventura, Calif., are (left to right): C. W. Petit, city councilman representing the mayor of Ventura; Sam Rogers, Shell bulldozer operator; L. A. Price, chairman Ventura County Board of Supervisors; and F. D. Kuenzly, manager of the plant. About 100 Ventura city and county leaders attended the ceremonies and luncheon. Scheduled for completion in mid-1953, the plant will manufacture about 150 tons of liquid ammonia fertilizer from natural gas, water, and air.

fluor's modern research facilities

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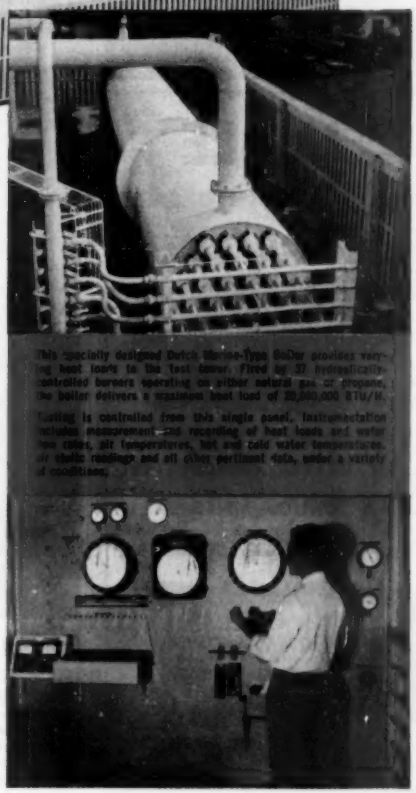
At Fluor, the proof of the design is in the testing. *Before* new Cooling Tower developments are incorporated into standard design, they are subjected to rigorous tests in this modern, commercial-size tower testing laboratory. Here, design and performance efficiency of every new development is determined through complete ranges of actual heat transfer conditions. Realistic rating data is established under conditions *paralleling* those of plant and process operations.

Fluor Cooling Tower Testing Facilities. This commercial-size installation consists of a pump house, instrument house, 20,000,000 BTU/H boiler, test basin, and a 40' high test tower.



This specially designed Dutch Marine-Type Boiler provides varying heat loads to the test tower. Fired by 37 hydraulically-controlled burners operating on either natural gas or propane, the boiler delivers a maximum heat load of 20,000,000 BTU/H.

Testing is controlled from this single panel. Instrumentation includes measurement and recording of heat loads and water flow rates, air temperatures, hot and cold water temperatures, air static readings and all other pertinent data, under a variety of conditions.

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A Fluor Cooling Tower recommendation means that all variables are included and compensated for. It means that all component parts, as well as all design theory, have been tested and evaluated under actual operating conditions. And, it means that a Fluor-designed cooling tower will perform at *rated* heat transfer efficiency under the conditions of installed operation. *You can be sure with Fluor!*

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PIPE LINES

Buckeye Under Way

Contract for initial leg awarded to H. L. Gentry

NEW YORK.—Buckeye Pipe Line Co. has let contract to H. L. Gentry Construction Co. of Jackson, Mich., for laying the first section of its new Eastern Products Division.

The original spread will consist of 73.9 miles of 16-in. line from Linden, N. J., to the vicinity of Allentown, Pa. Austin Co., of New York, has contract for the pump station at Linden.

Completion of this first leg of the system is expected later this year. It will connect with the new 10 and 12-in. products lines laid from Allentown to Pittsburgh by Tuscarora Oil Co., Ltd., a subsidiary of Esso Standard Oil Co.

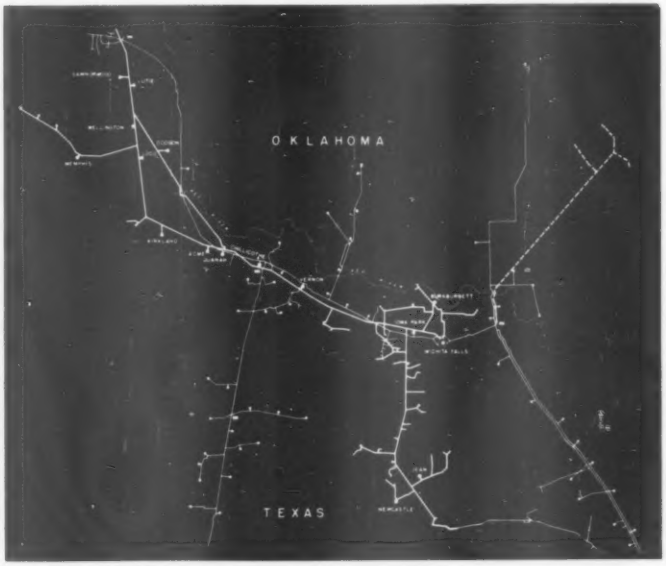
Pipe delivery . . . Pipe for the remainder of the $23,400,000 system to serve central and western New York State, has been approved by the Petroleum Administration for Defense for delivery during the first and second quarters of 1953.

Pipe is now on hand for the Linden-Allentown section, and Buckeye has placed an order with National Tube Co. of Pittsburgh for 8.3 miles of 8-in., 96.2 miles of 10-in., and 186 miles of 14-in. pipe for the rest of the system to be laid next year.

Final plans for the system call for a new 14-in. line from Allentown to Auburn, N. Y. This line will branch at Auburn with 10-in. lines extending eastward to Syracuse and westward to Caledonia, south of Rochester.

At that western terminus, the system will connect with the existing system of Buffalo Pipe Line Corp., a subsidiary of Keystone Pipe Line Co. Thus, Buckeye's Eastern Products Division will be tied into the Buffalo area. The company has abandoned plans for extending its own system to that city.

The proposed leg from Syracuse to Oswego on Lake Ontario also has



Lone Star's System—Existing and Planned

Lone Star Gas Co.'s enlarged network of natural-gas lines will be expanded further by completion of a new 70-mile, 20-in. transmission line (broken line on map) planned from natural-gasoline plants in Garvin County, Oklahoma, to the firm's compressor station at Petrolia in Clay County, Texas. The company's system before purchase of the former United Gas Corp. properties from Martin Wunderlich and Lee Aikin is shown by light lines, while heavy lines represent the 678-mile network recently handed over to Lone Star by Wunderlich and Aikin in the $5,692,325 transaction (The Oil and Gas Journal, May 12, 1952, page 199).

been dropped since outlet to Buffalo will give the system access to the Great Lakes.

Capacity . . . The Linden-Allentown leg will have a daily capacity for moving 100,000 bbl. of products, and the capacity northward out of Allentown will be 40,000 to 50,000 bbl. per day.

Terminals in the new system will be located at Macungie, Allentown, and the Wilkes-Barre-Scranton area in Pennsylvania and at Binghamton, Auburn, Liverpool, Syracuse, Waterloo, and Caledonia in New York. Booster stations will be built at Lehighton and Nicholson, Pa., and Auburn, N. Y.

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The common-carrier system is expected to be used by such shippers as California Oil Co., Cities Service Oil Co., Cooperative Grange League Federation Exchange, Inc., Esso Standard Oil Co., Hartol Petroleum Corp., Shell Oil Co., Sinclair Refining Co., The Texas Co., and Tide Water Associated Oil Co.

New Plantation System to Handle Up to 221,000 Bbl.

ATLANTA.—Throughput of Plantation Pipe Line Co.'s new system soon will be raised to 221,000 bbl. daily with the completion of certain pump stations, according to C. R. Younts, Plantation president.

Speaking informally before the Atlanta chapter of the National Association of Professional Engineers May 19, Younts discussed the principal features of Plantation's method of transporting refined products.

He said the company is planning to operate its booster stations projected for lateral lines with remote control.

Wilcox Trend Seeks O.K. on Gas System In South Texas

DALLAS.—Wilcox Trend Gathering System, Inc., headed by Harry W. Bass, independent operator and drilling contractor, has asked the Federal Power Commission for authority to build a natural-gas-gathering system of 100,000,000 cu. ft. capacity along the Wilcox Trend in South Texas.

The proposed system would consist of 157 miles of 14 and 16-in. main pipe line, plus some 60 miles of lateral lines, and was expected to cost approximately $10,583,000.

John C. Jacobs, attorney, is secretary-treasurer and spokesman for the new firm. He and his associates have been getting commitments from sellers of gas along the proposed route, which extends through Duval, McMullen, Live Oak, Karnes, Goliad, Bee, Victoria, Dewitt, Jackson, and Lavaca counties.

It was reported that adequate supplies of pipe would be available for the gathering system, and that a 2,200-hp. compressor station would be built in south-central Dewitt County, 40 miles from the end of the line, which will tie into Texas Eastern Transmission Corp.'s system in Lavaca County for delivery to the Atlantic Coast.

Jacobs said that if FPC approval is given an application will be filed immediately with the Petroleum Administration for Defense for the necessary materials.

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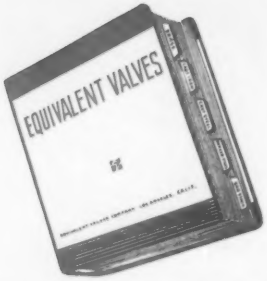

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REFINING

New Refinery

Esso looks over sites in Virginia, North Carolina

NEW YORK.—Esso Standard Oil Co., Inc., revealed last week that the company is considering the construction of the new eastern seaboard refinery, which may be located in either Virginia or North Carolina.

The company recently acquired an option to purchase an 800-acre tract in Norfolk County, Virginia, which company spokesmen states, is one of three or four locations now being investigated.

Borings are now being taken on the Norfolk tract on the Elizabeth River to determine soil-bearing properties and attendant piling costs—important preliminary factors determining the feasibility of locating a modern refinery. This initial survey work does not necessarily mean that the plant will be located at Norfolk.

Crude charge . . . Although plans for the proposed refinery are not yet firm, it is probable that it will have a crude-charging capacity on the order of 40,000 to 50,000 bbl. per day. It is reported that it will be a fuels plant primarily producing gasoline, burning oils, diesel fuels, and fuel oil. Sites under consideration fall between two existing Esso refineries at Baltimore and Charleston.

Esso now operates five refineries on the East Coast. Its Everett refinery in the Boston area, rated at 32,000 bbl. per day, now is adding an 18,500-bbl. per day fluid catalytic cracking unit.

The Bayway and Bayonne refineries, with a combined crude capacity of 165,000 bbl. per day, are being expanded and modernized to some extent by the construction of a 28,500-bbl. per day atmospheric unit.

The Chesapeake Bay area is served by a 55,000-bbl. per day refinery at Baltimore, and the company operates a small 7,500-bbl. per day plant at Charleston, S. C. With the exception of the latter plant and one other small skimming and asphalt refinery, located in Georgia, no other eastern seaboard refineries are operated by the refining industry south of the Baltimore area.

Shell Plants Process 13 Per Cent More Crude in '51

HOUSTON.—Figures just released indicate that Shell Oil Co.'s five refineries increased their total of crude oil processed last year by 13 per cent over 1950, establishing an all-time high for the company.

Projects currently planned or under way will add about 100,000 bbl. daily to present total capacity of 397,000 bbl daily.

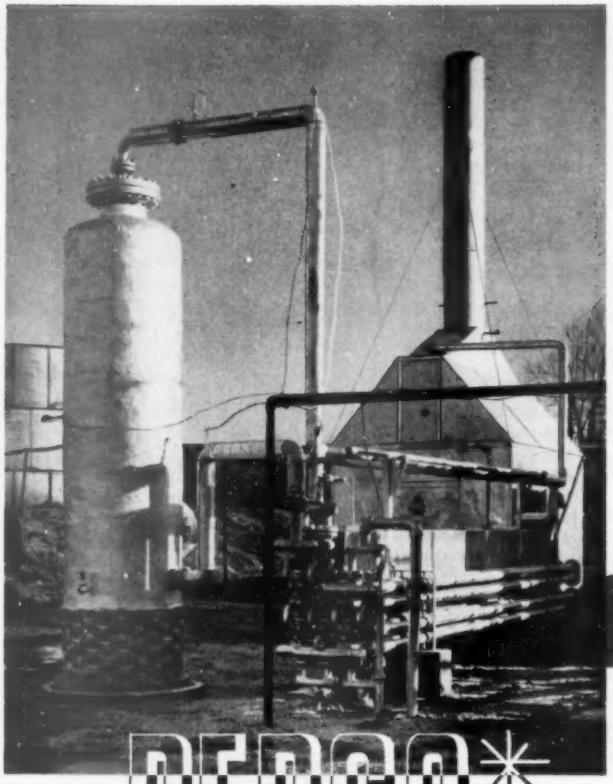
Additional capacity is planned for the Wood River, Ill., and Norco, La., plants, and modernization and replace-

NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949, pages 91, 92.
Compiled by W. L. Nelson—Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, and October.

INDEX (1946 = 100)

	1948	1949	1950	1951	Feb. 1952
Centrifugal pumps	120.0	118.9	128.1	136.2	136.2
Reciprocating pumps	138.1	144.6	143.9	182.4	183.3
Compressor	128.0	120.0	118.8	138.1	138.1
Engines	120.0	115.5	117.9	137.1	137.1
Motors	112.7	114.0	130.8	148.8	148.8
Transformers	116.0	116.0	116.0	130.5	130.5
Instruments	120.0	122.0	127.8	142.3	142.4
Miscellaneous equipment avg.	122.1	121.6	126.2	145.1	145.2
Materials component	139.3	143.6	149.5	164.0	162.9
Labor component	128.0	137.1	144.0	152.5	156.9
Refinery construction index	132.5	139.7	146.2	157.2	159.3



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ment programs have been announced for the Wilmington and Martinez refineries in California.

Current capacities of Shell's plants are: Wood River, 130,000 bbl. per day; Houston, 120,000 bbl. per day Wilmington 52,000 bbl. per day; Norco, 50,000 bbl. per day; and Martinez, 45,000 bbl. per day.

Refining Dividends Up 25 Per Cent in First Quarter

WASHINGTON.—Publicly reported cash-dividend payments of refining corporations during the first quarter of 1952 totaled $240,200,000 compared with $191,600,000 in the same period last year, according to Commerce Department computations.

The 25 per cent increase, unequalled by any other manufacturing industry, was attributed by the department to a combination of capital expansion and higher dividend rates.

Due to a general shifting of dividend dates, March disbursements accounted for most of the quarter's dividend payments, amounting for refining corporations to $231,000,000, compared with $172,400,000 in the same month last year.

Refining Briefs

The refining committee of the Rocky Mountain Oil and Gas Association will hold a 2-day meeting at the Newhouse Hotel, Salt Lake City, September 4-5. According to John S. Cole of Ethyl Corp., Salt Lake City, chairman of the committee, the meeting will consist of sessions on industrial relations and safety. A full day is planned for operating and processing subjects which will include a survey and comparison of new catalytic reforming processes, including cost, performance, and yield discussions.

The Refining Division of American Petroleum Institute has tentatively selected New York City for its 1953 midyear meeting, to be held next spring. A final decision as to the place and date of the meeting will be reached this summer by the Institute's board of directors.

A patent covering the use of a company - developed corrosion preventive called "RD-119" in antirust gasoline and distillate fuels has been issued to Sinclair Refining Co. The chemical, first used in the company's products pipe-line system, was developed by Sinclair Research Laboratories, at Harvey, Ill.

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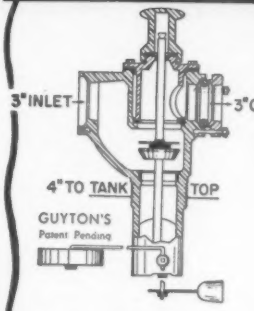

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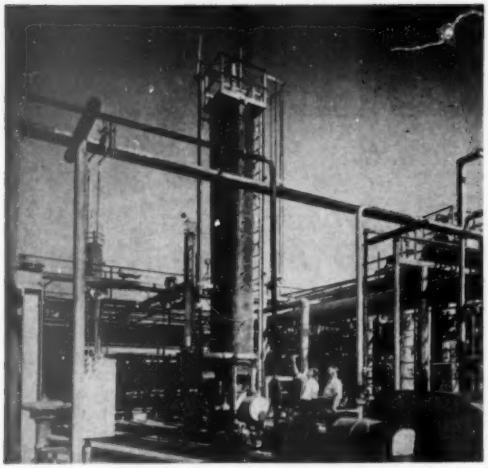
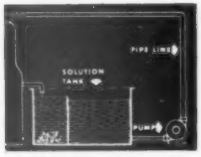


Clean towers in-place—save days—save dollars



Working size blueprints of this installation are available. No charge.

HERE'S the blueprint of an Oakite installation that cuts tower cleaning time to as little as 24 hours . . . saves up to $1000.

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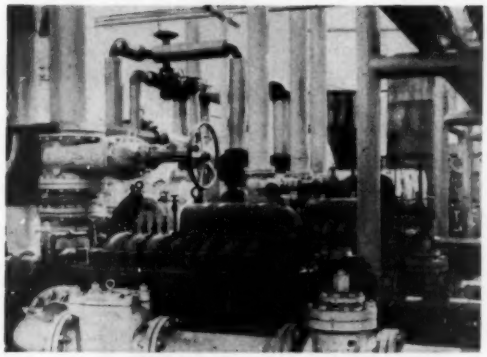

Goulds for continuous, 24 hour, HEAVY-DUTY service

The installation of Goulds 6-stage lean oil pumps shown above is in a Texas gasoline plant. Hundreds of these high-pressure centrifugals are operating today and many of them have been operating for years in the stations of prominent oil and pipeline companies.

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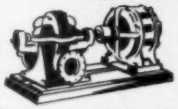
Bulletin 722.4 describes the outstanding features of construction and gives complete specifications for Goulds High Pressure Centrifugal Pumps Figs. 3360 and 3365. Write today for a copy.

OTHER GOULDS PUMPS TO CONSIDER



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LEADING THE FIELD OF SEISMIC EXPLORATION

Anadarko Area Discoveries

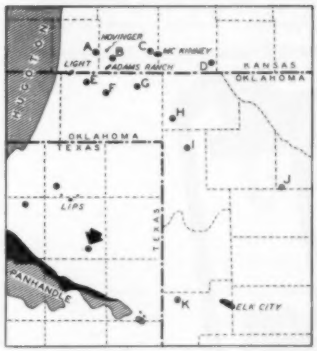
AN impressive number of completed or indicated discoveries in the northwestern portion of the Anadarko basin has been built up since the first of the year until now this area has become one of the more interesting in the country.

The most recent indicated discovery is Gulf Oil Corp. 1 Haggard in the Texas Panhandle (arrowed on map). This wildcat, on trend with Beckham County's Elk City field, flowed 346 bbl. of high-gravity oil with about 150 bbl. of water in 5 hours from Pennsylvanian-granite wash at 6,728-72 ft. The 2 Haggard, a southeast offset drilled to confirm shallower shows found in the 1 Haggard, recently flowed 48°-gravity oil at rates up to nearly 800 bbl. daily from Permian-Brown (Wolfcamp) dolomite at 4,009-35 ft.

There have been several other discoveries made in the area to the north of the tremendous interconnected reservoirs of Permo-Pennsylvanian age in Panhandle field, notably Lips gas-distillate field in Roberts County (see this page in May 26 issue); but Gulf's indicated discoveries, especially the one in granite wash, appear most significant at the present time.

Another indicated discovery on the northern flank of the Wichita and buried Amarillo mountains is Carter Oil Co. 1 Atwood, K on map. This deeper pool wildcat is testing gas and distillate in the Pennsylvanian-Deese at about 13,000 ft. It offsets the 1 Garrett which was completed 1 year ago as a 156-bbl. oil well in the Hoxbar at 10,275 ft.

More and more discoveries are popping up in the northern sweep or shovel end of the Anadarko basin. These discoveries, though many have proved to be but teasers, have added interest to the great potentialities seen for wedge-outs by truncation of early Pennsylvanian, late Mississippian-Chester, and older rocks. These stratigraphic traps could well hold untold quantities of oil—oil that was generated on the shelf areas of the basin or which, possibly, migrated up from the deeper parts of the Anadarko basin to the south and east.



Is it possible that the enormous volumes of gas in Hugoton field and oil and gas in Panhandle field were originally associated with oil in marine Pennsylvanian, Mississippian, or older rocks? Many think so, and if they're right there's a "mother lode" somewhere in this area which might well rival East Texas.

Recent discoveries that have heated up the shovel end and flank area of the Anadarko area are keyed on the map as follows:

A. Flynn Oil Co. 1 Jury, Seward County. Flowing 45 bbl. of oil daily through tubing from Mississippian-St. Genevieve at 5,860 ft.

B. R. E. Adams 1 Bromwell, Meade County. Completed for a pumping potential of 95 bbl. of oil daily from top of basal Pennsylvanian-Morrow at 5,900 ft.

C. Deep Rock Oil Corp. 1 Horner gaged 11 M.M.c.f. gas daily from upper Mississippian at 5,750 ft.

D. Sunray Oil Corp. 1 Harper, Clark County. Tested 7.5 M.M.c.f. gas daily with 10 bbl. of distillate per M.M.c.f. from top of Mississippian-Chester at 5,460 ft.

E. Carter 1 Sharp, Beaver County. Completed flowing 156 bbl. oil in 4 hours with gas at rate of 1.8 M.M.c.f. daily from Pennsylvanian-Cherokee at 5,850 ft.

F. Flynn 1 State. Now pumping 47 bbl. daily from the Pennsylvanian-Lansing at 4,770 ft. (This well, which appeared so exciting when it first indicated oil in the Pennsylvanian-Marmaton, has been offset to the east and south by dry holes.)

G. Pure Oil Co. 1 Albert. Completed as a 2-M.M.c.f. gas well in the Morrow at 6,020 ft.

H. Sunray Oil Corp. 1 Wolfe, Harper County. Flowed 47 bbl. of distillate and 5.2 M.M.c.f. gas from the Morrow at 7,225 ft.

I. Carter 1 Rosendale, Ellis County. Tested 1 M.M.c.f. gas and 30 bbl. distillate daily at 8,500 ft. in the Morrow.

J. Continental Oil Co. 1 Kimball, Major County. Completed for 138 bbl. of distillate and 2.3 M.M.c.f. gas from Chester at 8,450 ft.

Discoveries to date in the shovel end of the Anadarko basin indicate that lowermost Pennsylvanian (which some believe to be Mississippian) and uppermost Mississippian rocks offer the most promising objectives.

Philip C. Ingalls

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

NORTH DAKOTA . . . Production has been extended 35 miles south of Beaver Lodge into McKenzie County with the completion of Amerada Petroleum Corp. 1 Risser, Croff area wildcat.

MONTANA . . . C. C. Thomas 1 Huber, East Poplar extension, flowed 45 bbl. of oil hourly through 15/64-in. choke on a test of three zones following acidization.

WYOMING . . . British-American Oil Producing Co. 1-T Tribal, significant discovery in Steamboat Butte field, recovered 1,985 ft. of oil in 1 hour from the Sundance 7,189-7,241 ft. Located on the southwest flank of this field, the strike indicates a new reservoir on the west side of Steamboat Butte, previously considered nonproductive.

PERMIAN BASIN . . . The southeastern part of the basin has chalked up a new discovery at Geochemical Surveys, Inc., 1-M John W. Harris, Tract 13, Cabrera Survey 514, Runnels County. The strike rated a potential of 277.58 bbl. of 44°-gravity oil daily from 3,890-3,904 ft.

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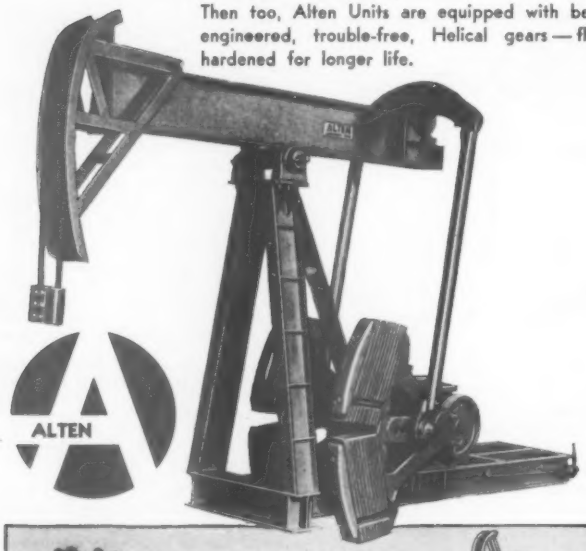

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Kansas

Lane County Opens First Oil Production

LANE County, in the upper part of the Hugoton embayment of the Anadarko basin, in western Kansas, is getting its first oil producer. Hugoton Production Co. 1 Flo, NW NE SW 19-17-29, 7 miles northwest of Dighton, in the northern part of the county, swabbed at an average rate of 6 bbl. of clean oil per hour while testing its prospective pay zone in Marmaton lime, opposite which casing is perforated at 4,397-4,426 ft. Hole had been drilled to 4,709 ft. in Mississippian, topped at 4,599 ft., without finding additional important showings in the lower horizons. Casing was run to 4,534 ft. Nearest production is in the new Jasper pool, 12 miles to the north in southern Gove County.

Clark County, in the southern part of the embayment, also has a new gas-distillate producing area, where Sunray Oil Corp. 1 Harper, C SE SE 21-34w-21w, flowed 7,500,000 cu. ft. of gas with 75 bbl. of distillate per day from the upper part of the Mississippian Chester zone. Pay is open through casing perforations at 5,452-60 ft. Hole was plugged back to 5,510 ft. after swabbing tests from perforations at 5,536-45 ft. yielded only 4 bbl. of oil with 2 bbl. of water in 6 hours. Total depth is 7,350 ft. with casing at 5,615 ft. The location is southeast of Ashland and only 4½ miles from the Oklahoma line.

Columbian Fuel Corp. 2-C Adams, C NE NE 7-35-29, 1½ miles southeast of East Adams Ranch gas-distillate producing area in southwestern Meade County, adjoining Clark County to the west, flowed 5,213,000 cu. ft. of gas daily while testing a lower Pennsylvanian zone, perforated at 5,780-94 ft. Total depth is 6,237 ft. in Mississippian, topped at 5,893 ft.

A new producing area is being opened in Ellis County where Alpine Oil & Royalty Co. is putting its 1 Crissman, SE NW NW 1-13s-18w, on the pump following swabbing tests, in which the well produced at the rate of 15 bbl. of oil per hour. Pay is in Arbuckle lime, topped at 3,590 ft. and open below 3,592 ft. to total depth of 3,608 ft.

KANSAS SUCCESSFUL WILDCATS

Decatur County: Continental Oil Co. 1 Feely, SE SE SW 2-5s-27w, pumped 784 bbl. oil from Lansing 3,590-3,604 ft., TD 4,042 ft.

Ellis County: National Cooperative Refining Association 1 Ginther, NE NE SW 17-11s-19w, pumped 110 bbl. from Arbuckle 3,555-58 ft., TD 3,558 ft. (opens Ginther pool).

Graham County: Bay Petroleum 1 Schmeid, NW NW SE 21-2s-25w, pumped 68 bbl. of oil from Lansing-Kansas City 3,740-44 ft., TD 4,474 ft.

Petroleum, Inc., 2 White, NW NW SW 25-10s-21w, pumped 154 bbl. of oil from Lansing-Kansas City 3,716-20 ft., TD 3,720 ft.

KANSAS WILDCAT FAILURES

Butler County: White & Ellis 1 Frazier, NW NW NE 20-26s-4e, dry, TD 2,822 ft.

Cowley County: Rex & Morris 1 Ramsey, NW NW NE 16-31s-4e, dry, TD 3,405 ft.

Weidemann 1 Cranton "B," SE SE SW 19-32s-6e, dry, TD 2,292 ft.

Ellis County: Palmer Oil Co. 1 Hall "A," SW NW NE 12-12s-17w, dry, TD 3,610 ft.

Pabco 1 Dortland, NW NE SW 13-13s-16w, dry, TD 3,445 ft.
Musgrove 1 Dreiling, NE NE NE 4-14s-17w, dry, TD 3,679 ft.
Murfin Drilling Co. 1 Long, NE NE SW 14-14s-17w, dry, TD 3,605 ft.
Gove County: Ben Brack 1 Graham, NE NE NW 26-12s-28w, dry, TD 4,776 ft.
Logan County: Vickers 1 De Weese, SW SW SW 13-15s-33w, dry, TD 4,692 ft.
Osborne County: Watlers Drilling Co. 1 Meyer, SE NE NE 10-10s-15w, dry, TD 3,862 ft.
Pratt County: Time Petroleum 1 Banbury, SE SE SW 18-28s-12w, dry, TD 4,752 ft.
Russell County: Duke & Wood 1 Dumler, SE SE NW 15-14s-13w, dry, TD 2,432 ft.
Sheridan County: B&R 1 Carter, NE NE SE 2-10s-26w, dry, 4,617 ft.
Victor 1 Zerr, NE NE NW 9-10s-27w, dry, TD 4,680 ft.
Smith County: E. F. Wakefield 1 Stockton, SW SW SW 26-2s-15w, dry, TD 3,900 ft.
Stafford County: Veeder-Lockhart 1 Bennett, NE NE NW 7-24s-12w, dry, TD 4,090 ft.
Meade County: R. E. Adams et al 1 Bromwell, C SW NW 7-34s-29w, flowed 74 bbl. oil from 5,901-08 ft., TD 6,180 ft.
Columbian Fuel Corp. 2 Adams "G," C NE NE 7-35s-29w, flowed 5,200 M.c.f. of gas from 5,780-94 ft., TD 6,237 ft.

Oklahoma

Deeper Pay Zone Proved At Northeast Mayfield

CARTER OIL CO. is proving the second producing horizon for the new Northeast Mayfield field, in northwestern Beckham County, in the extreme western part of the state, at its 1 Atwood, SE NW NW 4-10n-25w. The new pay is the Des Moines granite wash, from which the well, with hole open from 12,768 ft. to 13,274 ft. (total depth), flowed 785 bbl. of fluid, 25 per cent (196 bbl.) being 52°-gravity distillate, in the first 23 hours through 1-in. choke, with gas production at the rate of 6,668,000 cu. ft. per day. The remainder of the fluid consisted of fresh water (61 per cent), mud, (8 per cent), and foamy emulsion (6 per cent). It contained no salt water.

On a later 24-hour gage, through ¾-in. choke, the well flowed 420 bbl. of fluid, consisting of 30 per cent (126 bbl.) of distillate, 65 per cent (273 bbl.) of water, and 5 per cent (21 bbl.) of mud, with a corresponding volume of gas.

The well is the southeast diagonal 40-acre offset to the discovery, and so far only other producer, 1 Garrett, completed early this year in the Hoxbar Conglomerate zone, opposite which casing was perforated at 10,271-95 ft.

Carter also has encountered promising showings in the first confirmation test for its recently completed Oswego lime discovery well in the Greenough area of Beaver County, in the Panhandle. This well, 1 Grove, C NW NE 6-5n-22eCM, southwest, diagonal 40-acre offset to the discovery well (Carter and Emby Kaye 1 Sid Sharp), recovered 630 ft. of clean oil with 90 ft. of mud and 3,120 ft. of water in a drill-stem test, open 195 minutes, at 5,613-31 ft. The interval is believed to be in the upper part of the Oswego. Pay zone of the discovery well is in the lower part of the Oswego at 5,833-49 ft. Operators are coring ahead in the confirmation test.

Davidor & Davidor are making a good Bartlesville sand well at their 1 Harned, NE SE SE 4-15n-2w, 4 miles south of Guthrie, Logan County. On a 24-hour gage, the well flowed 242 bbl. of 46°-gravity oil through ½-in. choke. Pay is open through casing perforations at 5,519-29 ft. with top of the Bartlesville at 5,526 ft. The well previously had tested Simpson Dolomite, from which, with casing perforated at 5,880-83 ft., it flowed 1½ bbl. of oil and 5½ bbl. of water per hour. Wilcox sand, drilled to 6,148 ft., was dry. Location is 2 miles north of the Pleasant Valley pool, nearest production.

Skiles Oil Corp. has a new discovery well at its 1-A George Smith, NE SW NE 2-13n-3e, 5 miles southwest of Chandler, Lincoln County. Testing Prue sand, open at 4,066-80 ft., the well flowed an average of 6 bbl. of oil per hour through ⅛-in. choke, filling available storage. Nearest production of any kind is 2½ miles to the northwest in the small southeast Warrick pool.

OKLAHOMA SUCCESSFUL WILDCATS

Carter County: Sinclair Oil & Gas Co. 1 Brown, C SW NW 20-4s-1e, flowed 204 bbl. of 39.4°-gravity oil from base sand 5,624-66 ft., TD 5,717 ft.
Lincoln County: Jon Carson 1 Jones, SW SW NW 7-16n-2e, pumped 65 bbl oil from Red Fork 4,624-30 ft., TD 4,651 ft.
Logan County: Robert M. Jordan 1 School land, NE NE NW 16-17n-1w, pumped 20 bbl. of oil from Bartlesville 4,870-79 ft., TD 5,070 ft., (extends West Langston pool).

OKLAHOMA WILDCAT FAILURES

Beaver County: Kaye et al 1 Goshorn, C SE SE 31-4n-22ecm, dry, TD 7,105 ft.

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Huber 1 Heitschmidt, C NW 14-6n-21ecm, dry, TD 6,315 ft.

Carter County: The Texas Co. 1 Majors "B," SW SE NE 20-1s-2w, dry, TD 3,521 ft.

Jackson County: Gerson La Pidus et al 1 Campbell, NW NE NW 31-2n-18w, dry, TD 1,050 ft.

Jefferson County: Davidor & Davidor 1 Capehart, NW SW SW 15-6s-4w, dry, TD 5,780 ft.

Kingfisher County: Shamrock Drilling Co. and Warren Bradshaw 1 Shuttler, SW SW 16-17n-5w, dry, TD 6,512 ft.

Lincoln County: Warren Oil Corp. 1 Gordon, NW SE SE 14-13n-3e, dry, TD 5,340 ft.

Deep Fork Drilling Co. and Vic Crowell and J. R. Wilson 1 Quinn, SW NW NE 6-13n-5e, dry, TD 4,851 ft.

Logan County: Foundation Oil Co. 1 Sieck, SE NE NE 23-16n-2w, dry, TD 5,950 ft.

Noble County: Signal Oil & Gas Co. 1 Robbins, NE NE NW 6-22n-2w, dry, TD 4,145 ft.

Pawnee County: J. R. Porter 1 Webb, NE NE NE 30-23n-4e, dry, TD 3,980 ft.

Payne County: W. H. Martgan 1 Wetzel, SW SW SW 10-19n-3e, dry, TD 4,045 ft.

Pottawatomie County: Skiles Oil Corp. 1 Thompson, NW NE NW 7-7n-3e, dry, TD 4,846 ft.

Stephens County: Christie-Stewart Drilling Co. 1 Tillerson, SE NE SW 11-1n-9w, dry, TD 3,517 ft.

California

Honor Rancho Extensions Are Indicated Successes

LOS ANGELES.—Two extension tests to Honor Rancho-Castaic Hills field in upper Santa Clara Valley, Los Angeles County, have indicated they will be successful. On the northwest edge of the 2½-mile production trend, a test of Standard Oil Co. of California appeared to have extended production two locations south. At the opposite end of the trend The Texas Co. 2 Honor Rancho-2 was continuing to explore ahead at 8,000 ft. but tests as shallower depths indicated it will move productive limits two locations east.

Standard 85-1 Golden, in NE SE 35-5n-17w, on a drill-stem test at 6,464-6,542 ft. flowed at the daily rate of 860 bbl. The flow was based over a 20-minute period and started after the tester had been open for about 53 minutes. Following the test the operator started coring ahead in search of more Sterling sand and had bottomed hole at 6,698 ft. at last reports.

The Texas Co. 2 Honor Rancho, in NE SE 6-4n-16w, has indicated it would make a producer in the Rancho sand, the field's spotty upper pay. The Wayside sand, the field's principal pay, was not definitely identified but the formation which was believed to be the zone was not productive. Presence of cross faulting between the extensioner and other producers was suspected as the cause of the comparatively rapid change in formation characteristics.

Gas activities . . . While information on the well's capabilities was not available, Standard of California has completed what is believed to be an important gas discovery in the Parkford area of Sacramento County. Located in SW NE 19-7n-5e, or some 12 miles north of Thornton gas field, its 1 Simms Community makes a substantial gas flow from around 7,000 ft. Following completion the discovery was shut in.

Also in Sacramento County and about 3 miles northeast of the Rio Vista field, Brazos Oil & Gas Co. 1 Josephine Robinson Unit indicated it might make a small gas producer. Trouble was had in completing the wildcat, which is located in SW SW 9-4n-4e, so that it was temporarily shut in. Total depth of this potential discovery was 4,328 ft., with 5-in. casing set at 3,646 ft.

CALIFORNIA SUCCESSFUL WILDCAT

Fresno County, new Temblor sand discovery in Coalinga Nose field: Los Nietos Co., Opr. 86 V "18 F," NE SE 18-20s-16e, flowed 790 bbl. per day through perforations at 6,380-6,445 ft., 37.9°-gravity crude, 0.2 per cent cut, 20/64-in. bean. TD 6,449 ft., elev. 766 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Cymric area: L. R. Wilhite 2 Williams, 2-30s-21e, dry, TD 3,304 ft., elev. 906 ft.

Mountain View area: Universal Cons. Oil Co. 13-23 Easton, 23-30s-28e, dry, TD 5,960 ft., elev. 371 ft.

Los Angeles County, Placerita area: March Oil Co. 1 Boylan, 21-4n-15w, dry, TD 1,350 ft., elev. 1,422 ft.

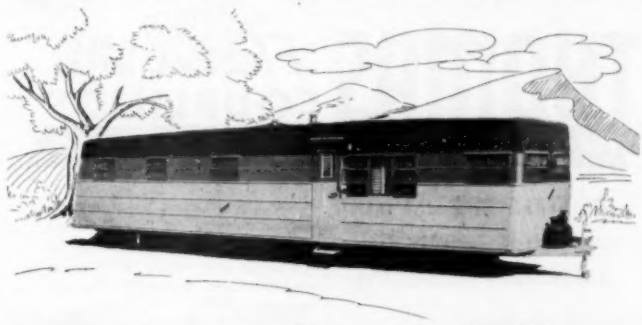
Monterey County, Pine Canyon area: The Texas Co. 1 Basham, 36-20s-7e, dry, TD 5,477 ft., elev. 914 ft.

San Luis Obispo County, Cuyama Valley area: C. W. Colgrove 35-21 Mettler, 21-10n-25w, dry, TD 9,186 ft., elev. 2,340 ft.

C. W. Colgrove 42-34 Russell, 34-A-11n-27w, dry, TD 5,688 ft., elev. 1,938 ft.

Creston area: Dielectric Laboratories, Inc. 1 Mary Ryan, 21-28s-14e, dry, TD 750 ft., elev. 1,525 ft.

Dielectric Laboratories, Inc. 3 Ryan, 20-28s-14e, dry, TD 680 ft., elev. 1,404 ft.



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Rocky Mountain

Croff Area Wildcat Extends Madison Production

DENVER. — Important developments in both the North Dakota and eastern Montana portions of the Williston basin headlined a week which saw new activity and developments of more than passing importance in every portion of the Rockies.

Amerada Petroleum Corp. has finaled the southernmost of its wildcat efforts along the Nesson anticline in North Dakota, with an announced potential of 70 bbl. of oil, 14 of water in 6 hours through ½-in. choke at 1 Risser, C SW SE 12-149n-96w, in McKenzie County. Tubing pressure during the test was 100 psi., with flow of gas at the rate of 104,000 cu. ft. in 6 hours. The well was drilled to 13,773 ft. total depth, test 11 bbl. oil per hour from the Devonian before plug-back for completion in Madison at present depth of 9,584 ft.

The completion of this wildcat extends production 35 miles south of the original discovery at Beaver Lodge. Amerada has a second location staked in the area, and a wildcat spudded in C NE NW 16-153n-95w, between the Croff area and production at Beaver Lodge.

Amerada has reported a potential of 416 bbl. of oil, 17 bbl. of water at 1 Heen, C SW SW 15-156n-95w in Beaver Lodge field, has two other wells nearing completion there. Tests of the Heen were ¼ and ⅜-in. chokes, with gas oil ratio 1,250:1.

Montana interest continues to center in the Poplar area of Roosevelt County, and the Cedar Creek area of southern Dawson County. C. C. Thomas has reported a flow of 45 bbl. of 40.6°-gravity oil from his extension a mile southwest of the recent C. H. Murphy, Jr., wildcat success in the East Poplar area. The Thomas well is 1 Huber, C SE NE 10-28n-51e. Production followed acidization of the zones 5,500-20 ft., 5,608-14 ft., and 5,626-28 ft., perforated with five holes per foot. At West Poplar Ajax Oil Co. of Billings reported that 1 McGowan, C SE SW 10-29n-50e, which made 15-20 bbl. of oil on early tests started flowing water shortly after tests began, is being squeezed and reperforated for further testing. At South Poplar, Deep Rock Oil Corp. of Tulsa has made location for a wildcat on a 10,800-acre block of fee and Indian lands in Roosevelt and McCone counties. The wildcat is located in C NW SE 8-27n-50e, about 11½ miles southwest of Murphy's discovery and 10½ miles southeast of Carter Oil Co.'s recent failure in NW SW 18-29n-50e, and is the first venture in the immediate area.

In Wyoming Gulf Oil Corp. continues test at 1 Stockham-Federal, C SE NW 2-46n-94w, southwest of Worland, which tested 12,000,000 cu. ft. of gas per day with distillate at the rate of 1,385 bbl. per day for the most promising discovery in the basin in recent months.

New starts in the Rockies continue high, with 44 announced during the past week. The previous week at 60. Montana and Wyoming continue to lead in number of new starts, both listing 14 last week.

COLORADO SUCCESSFUL WILDCAT

Sedgwick County, Chappel field: Stanolind Oil & Gas Co. 1 Susannah Franklin, C SE SE 35-12n-44w, flowed 7,350 M.c.f. of gas per day, shut in, TD 3,541 ft. PBTD 3,243 ft. Dakota 3,478 ft.

COLORADO WILDCAT FAILURES

Washington County: Chicago Corp. and Republic Natural Gas Co. 1 A. E. Scheetz, SE SE SW 11-3s-51w, dry, TD 7,396 ft. Reagan 7,348 ft.

Delta County, Delta area: James M. Oline 1 Government-Cline, NW SE NE 36-14s-94w, temporarily abandoned, TD 700 ft., Dakota 276 ft.

Logan County: Fred Manning, Jr. 1 Branerd, SE NE NE 29-8n-53w, dry, TD 4,943 ft. "J" sand 4,919 ft.

Morgan County: Benson & Montin, Inc., 1 Whittington, NE NE SW 13-5n-58w, dry, TD 6,248 ft. Morrison 6,200 ft.

Frontier Refining Co. 1 Hendershot, SE SE NW 7-5n-60w, dry, TD 6,814 ft., "J" sand 6,582 ft.

WYOMING SUCCESSFUL WILDCAT

Sheridan County, Ash Creek: J. Ray McDermott & Co. 1 Elsie Barry, NW NW SW 24-58n-85w, pumped 200 bbl. oil per day, 20 per cent water, TD 4,798 ft. Shannon 4,714 ft. (Shannon discovery).

WYOMING WILDCAT FAILURES

Natrona County, Iron Creek: Morris E. Ogle 1 Government, NE NW SW 11-32n-82w, suspended indefinitely, TD 1,000 ft. Dakota 898 ft.

Iron Creek: Morris E. Ogle 1 Smith, NW SE SW 11-32n-82w, suspended indefinitely, TD 990 ft.

Segment basin: A. R. Griffith 1 Government, SE NW NE 35-36n-81w, suspended indefinitely, TD 2,800 ft.

Sweetwater County, Dry Creek: The California Co. 1 Unit, C SW NW 12-14n-110w, dry, TD 5,922 ft. Wasatch 3,240 ft.

Weston County, Northwest Mush Creek: Rex Shenton et al 1 Anna King, NE SE NE 14-45n-64w, dry, TD 4,485 ft. Lakota 4,479 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Cheyenne County: Service Drilling Co. 1

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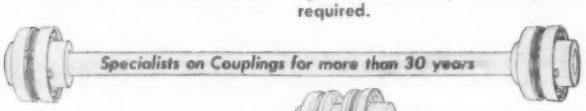

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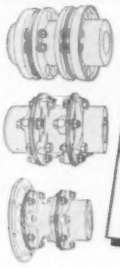

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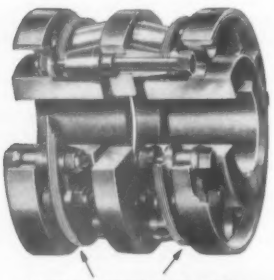

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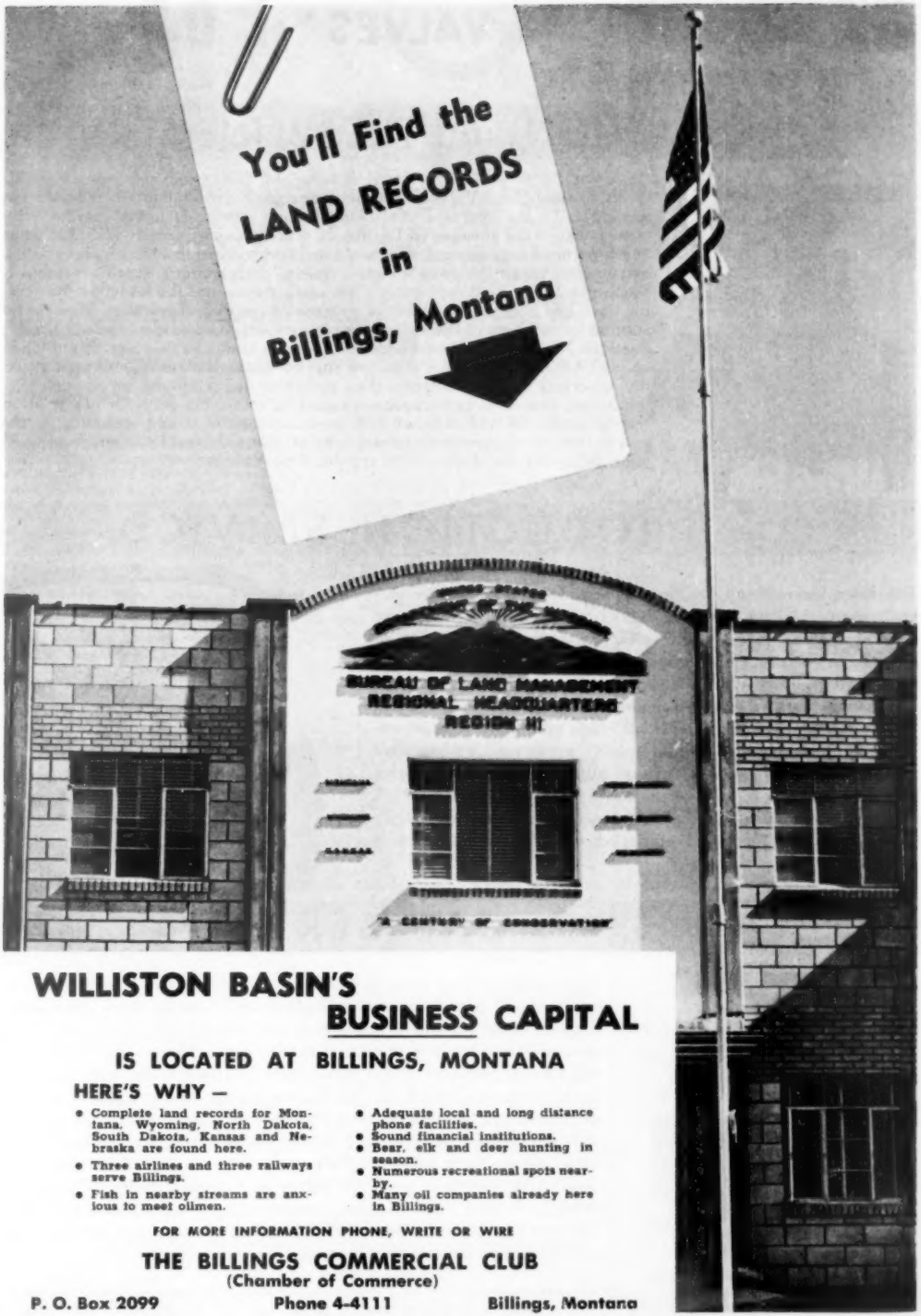

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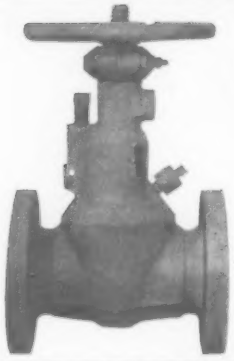

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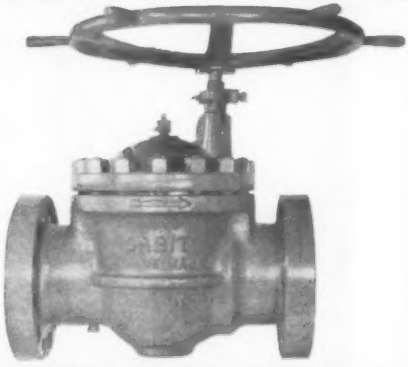
For many years Orbit Drilling Valves have been used to control commercial gas wells and gas storage wells all over the United States, Canada and foreign countries. Thousands of them have been operated daily and have never been out of service. Orbit Drilling Valves have been chosen for these services because they afford low cost maintenance, easy operation and a positive dependable shut-off in all kinds of weather conditions. "Switching" operations can be quickly performed by one man when a lease is equipped with these easy operating valves. Orbit Drilling Valves are made in sizes 5½", 7", 8⅝" and 10¾", Screw End and Flanged End and Cross Type. All Orbit Drilling Valves are furnished equipped with handwheel that is detachable.



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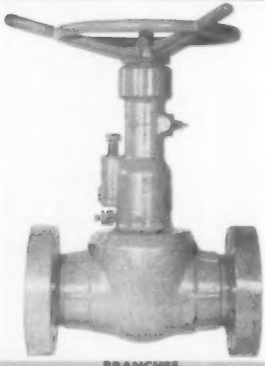

The Orbit resilient, friction free seating principle is a natural for holding liquefied petroleum gases. Regardless of minor body deflections, contraction or expansion brought about by fluctuating temperatures or pressures, the Orbit seating principle is not affected. No lubricant of any kind is required in the valve body to effect a shut-off; therefore maintenance of Orbit L. P. Gas Valves requires a minimum of expense and attention. Orbit L. P. Gas Valves also feature an all forged steel body and bonnet plus welded bonnet construction and adjustable reliable plastic stem packing—This combination makes the Orbit L. P. Gas Valve the "last word" in safety and dependability. The use of Orbit L. P. Gas Valves is your assurance against fluid contamination. You can buy Orbit Valves with confidence because they are designed to handle your hard-to-hold hydrocarbons and vapors.

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Swanson, NE NE NW 22-16n-51w, dry, TD 5,319 ft. Lakota 5,302 ft.

Deuel County: Argo Oil Co. and True & Brown 1 Schlake, SE SE SE 14-14n-42w, dry, TD 3,610 ft. "J" sand 3,478 ft.

Morrill County: Carl L. Brazell and Ten Weiner 1 Redfern, SE SE SE 24-22n-48w, dry, TD 3,889 ft. "J" sand 3,666 ft.

NORTH DAKOTA SUCCESSFUL WILDCAT

McKenzie County, Croff area: Amerada Petroleum Corp. 1 Risser, C SW SE 12-149n-96w, flowed 70 bbl. oil and 14 water through ½-in. choke in 6 hours, gas vol. 104 M.c.f. in 6 hours, TD 13,773 ft. PBTD 9,584 ft. Madison 9,284 ft.

North-Central Texas

Conglomerate Production At South Belcherville Proven

WICHITA FALLS.—George S. Engle 1 Grady Reed, Block 68, Belcher Subdivision, confirmed conglomerate production in the South Belcherville discovery pool with a flow of 608 bbl. of oil in 12 hours through ½-in. choke from perforations at 5,356-80 ft.

New exploration for Montague County was announced by Wrather Petroleum Corp. as the firm's 1 C. D. Meadow in Block 25, League 12, Calhoun CSL, 3½ miles east of Montague. Projected depth was 7,200 ft.

In Nolan County, Ohio Oil Co. 1-A Nemir, Rowan & Hope area, was dry in the Ellenburger at 7,486 ft. Rowan & Hope 1 Harkins, wildcat 3 miles northwest of Sweetwater, was drilling ahead at 5,205 ft.

The county gained a new 7,000-ft. exploration at Houston Oil Co. of Texas 1 L. E. Adrian, located in 53-20-T&P.

Haynes B. Gwnby Drilling Co. filed application to drill 1 Dan Smith as a 4,200-ft. rotary wildcat 2½ miles northwest of Goldsboro in Coleman County, in Section 469, W. M. Miller Survey.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: G. W. Cooper 1 A. D. Britton, W. Henley Sur., A-165, TD 4,424 ft., pay 4,404 ft., IP pumped 7.4 bbl. 42°-gravity oil.

Brown County: James C. Walker 1 H. J. Mathews, Sec. 9, HT&B Sur., TD 1,323 ft., Caddo pay 1,308 ft., IP 17.7 bbl. 37°-gravity oil.

Coleman County: United North & South Development Co. 1 Earl Morris, J. W. Robinson Sur., TD 3,650 ft., pay 3,536 ft., IP 34.8 bbl. 41°-gravity oil, 10/64-in. choke, TP 200 psi., GOR 200 cu. ft.

Eastland County: Malco Refineries, Inc., 1 A. N. Prince, N. Lomance Sur., TD 2,723 ft., Caddo limestone gas pay 2,723 ft., IP 90,000 cu. ft. of gas.

Jack County: Bridwell Oil Co. 1 J. E. Henderson, John Hill Sur., A-311, TD 2,329 ft., pay 2,321 ft., IP 84 bbl. 41°-gravity oil, 11/64-in. choke, TP 140 psi., GOR 350 cu. ft.

Jones County: Robinson-Puckett, Inc., 3 J. T. Casady, Sec. 49, D&DAL, TD 2,191 ft., pay 2,180 ft., IP 146 bbl. 36°-gravity oil.

Montague County: Standard Oil Co. of Texas 1 L. T. Mosley, M. B. Lewis Sur., A-424, TD 7,200 ft., elev. 850 ft., pay 6,607 ft., IP pumped 153.6 bbl. 39°-gravity oil.

Nolan County: Placid Oil Co. 1 R. E. Althof, 86-23-T&P, TD 7,050 ft., pay 7,030 ft., IP 20 bbl. 47°-gravity oil, ½-in. choke, TP 100 psi., GOR 388 cu. ft.

J. R. Tolbert and Claude White 3 Mrs. S. Houston, Sec. 2,089, TE&L, TD 2,430 ft., pay 2,426 ft., IP 240 bbl. 40°-gravity oil, ½-in. choke, TP 180 psi., GOR 400 cu. ft.

Warren Oil Corp. 1 B. F. Satterwhite, 15-6-T&P, TD 3,796 ft., pay 3,794 ft., IP 110 bbl. 41°-gravity oil, 21/64-in. choke, TP 380 psi. GOR 625 cu. ft.

Stephens County: Delta Oil Co. 1 B. McCrea, W. Edmondson Sur., TD 4,209 ft., Ellenburger pay 4,177 ft., IP 350 bbl. 47°-gravity oil, 5/16-in. choke, TP 150 psi., GOR 402 cu. ft.

Taylor County: Yucca Drilling Co. 1 L. W. Moore, 10-1-SPRR, TD 4,939 ft., elev. 2,081 ft., pay 4,918 ft., IP 67 bbl. 42°-gravity oil, ¼-in. choke, GOR 100 cu. ft.

Throckmorton County: Warren Oil Corp. 1 Bogan Higgs, Sec. 681, TE&L, TD 4,453 ft., Mississippian pay 4,442 ft., IP 296 bbl. 42°-gravity oil, 14/64-in. choke, TP 360 psi., GOR 367 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Archer Drilling & Production Co. 1 Grace Bell, Blk. 30, SPRR, dry TD 1,355 ft.

Archer Drilling 1-C Bell, Blk. 5, Clark & Plumb, dry, TD 1,198 ft.

E. B. Clark 1 Dan M. Powell, Sec. 1, SPRR, dry, TD 3,792 ft.

J. P. Horany 2 Olin Calvin, H. Grooms Sur., dry, TD 1,071 ft.

Horany 3 Olin Calvin, H. Grooms Sur., dry, TD 1,015 ft.

S. F. Hutcheson 2 C. S. Morris, Blk. 140, Wm. Henry Sur., dry, TD 1,138 ft.

C. P. Thurlkill 1-A Prideaux, Blk. 1,868, TE&L, dry, TD 830 ft.

Brown County: H. D. Lewis 1 Jennie Stone Thomas, R. Mitchell Sur. 141, dry, TD 1,139 ft.

Ranger Oil Co. 1 P. E. Pentecost, Sec. 21, A. D. Neill Sur. 41, dry, TD 933 ft.

Callahan County: Cosden Petroleum Corp. 1 Katie V. Dugan, Sec. 72, BBB&C, dry, TD 4,905 ft., elev. 1,955 ft., Mississippian 4,655 ft., Ellenburger 4,730 ft.

Garr Oil Co. 1 N. M. George, Sec. 80, BOH Sur., dry, TD 2,015 ft.

Coleman County: Callahan Rotary Co. and C. L. Richardson 1 C. M. Mosely, Blk. 58, J. D. Dillon Sur., dry, TD 1,815 ft.

The Chicago Corp. 1 Hayden Hargett, E. Garcia Sur., A-226, dry, TD 3,160 ft.

J. M. Hawley 1 E. J. Crowder, Blk. 22, H. Crocheron Sur. 656, dry, TD approximately 2,400 ft., elev. 1,565 ft., Smithwick 2,281 ft., Marble Falls 2,376 ft.

E. F. White, Jr. 2 Edith Anson Boulware, 16-1-GH&H, dry, TD 2,750 ft., Morris 2,520 ft., Jennings 2,645 ft., Gardner 2,745 ft.

Cooke County: F & M Drilling Co. 1 J. Haverkamp, P. R. Wertz Sur., dry, TD 3,016 ft.

Eastland County: F. F. Hanrahan 1-A Henry, H. P. Genoway Sur., dry, TD 1,315 ft.

Texton Oil Co. 1 W. W. Ezzell, Sec. 900, SA&MG, dry, TD 2,415 ft., elev. 1,676 ft., Caddo 2,316 ft.

Jack County: L. T. Burns 1 Addie Smith, D. J. Murphy Sur., A-1,289, dry, TD 3,735 ft.

Burton, Ingraham & Price 1 W. M. Brown, N. F. Rudmose Sur., dry, TD 5,002 ft. in the Caddo.

Burton et al 1 S. H. Plaster, N. P. Overby Sur., dry, TD 5,712 ft., Ellenburger 5,576 ft.

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Jones County: N. G. Bouchard 1 W. F. Walker, Sec. 16, BBB&C, dry, TD 2,665 ft.

Clark & Cowden 1 Segestrom, Sec. 134, BBB&C, dry, TD 3,263 ft.

Elm Oil Co. 1 A. A. Hayden, Blk. 4, G. Martinez Sur., dry, TD 2,500 ft.

Four W Oil Co. 1 W. C. Weir, 180-1-BBB&C, dry, TD 3,700 ft.

J. F. West 1 Jack Felts, Sec. 2, E. C. Miller Sur., dry, TD 2,005 ft.

Knox County: Wm. E. Jones 1 Mrs. Viola Hunt, J. Garner Sur., A-46, dry, TD 1,605 ft.

Montague County: Martin Wunderlich 1 McNatt, Sec. 9, H&TC Sur., dry, TD 6,013 ft.

Palo Pinto County: P. W. Billingsley 1 A. P. Wilbar, James Latham Sur., dry, TD 792 ft.

Stephens County: Star Oil Co. 1-C Tipton, Nancy Williams Sur., dry, TD 4,609 ft., elev. 1,238 ft., Mississippian 4,589 ft.

Taylor County: Lion Oil Co. 1 Enoch, Wm. S. Henry Sur. 461, dry, TD 5,721 ft.

Throckmorton County: W. P. Luse 1 Mrs. T. C. Crousen, Sec. 2,238, TE&L Sur., dry, TD 4,661 ft., elev. 1,271 ft., Caddo 3,824 ft.

Wilbarger County: T. V. Gorman 1-G Waggoner, 30-4-H&TC, dry, TD 2,426 ft.

Young County: Neeld & Hood Drilling Co. 2 W. P. Stephens, Blk. 1,946, TE&L, dry, TD 2,384 ft.

Rankin, Pitcock & Harper 1 Eliza Starke, H. M. Casall Sur., A-67, dry, TD 4,873 ft., Caddo 4,000 ft., Mississippian 4,775 ft.

R. E. Smith 1 Annie Stovall, Sec. 714, TE&L, dry, TD 4,911 ft.

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Southwest Texas

Buda Lime Well in Higgins-Borrego Finaled

CORPUS CHRISTI.—M. L. Wise has completed the 1 E. Hayden for 193.7 bbl. of 25.5°-gravity oil on pump from perforations in the Buda lime at 5,723-90 ft. with 72 shots. The 1 Hayden is located on a 40-acre lease, David F. Webb Survey, in the Higgins-Borrego field. Well was drilled to a total depth of 5,906 ft. with the top of Edwards lime reported at 5,900 ft. and tests in the Edwards showed sulfur water. Five and one-half inch casing was cemented to a depth of 5,900 ft. Previous tests on perforations 5,726-28 ft., 5,729-31 ft., 5,736-37 ft. and 5,748-51 ft. flowed at the rate of 2,500 bbl. of oil per day on a ½-in. choke. Production was reported to be from a cavity in the Buda lime.

Five miles northwest of Yancey, W. H. Ott set 5½-in. casing at 1,560 ft. at 1 E. E. Hood, Medina County. Well was drilled to 1,980 ft. in the Buda lime. Well was cored around 1,200 ft. but no reports on shows has been released. Sidewall cores had gas odors at 1,030 ft., 1,028 ft., 1,017 ft., and 1,012 ft. A drill-stem test was attempted in the 1,012-25 ft. interval, but the test failed. Location is in Adam Coble Survey.

Sinclair Oil and Gas Co. has opened a new gas pay 10 miles southwest of Taft, Nueces County. Hole was bottomed at 10,941 ft. and 5½-in. production string cemented to 9,681 ft. Test on perforations 9,295-9,314 ft. with 3/16-in. chokes flowed 2,130,000 cu. ft. of gas per day with a gas-fluid ratio of 13,500-1. Bottom-hole flowing pressure was 4,000 psi. Location is in State Tract 688, Nueces Bay.

The Charles A. Daubert & Walter Achning 1 F. B. Frels, oil discovery wildcat, 2 miles northwest of Mathis in San Patricio County, potentialed 105 bbl. of oil daily on a ⅛-in. choke with tubing pressure of 650 psi. Completion was finaled through perforations 4,708-11 ft. with hole bottomed at 4,848 ft. and 5½-in. production casing cemented to 4,770 ft.

Discovery is in Schliecher & Joseph Subdivision, M.P. & J.N. Delgado Grant, Block 8, A-4. South of the discovery, 3,600 ft. is the firms 1 A. Soehnge, was discovery. It was bottomed at 4,802 ft. with 5½-in. production string set to 4,100 ft. Well was waiting on potential through perforations at 4,024-28 ft.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Guadalupe County: oil discovery—Traders Oil Co. of Houston 1 Chase, H. R. Hunt ⅓ League, TD 2,320 ft., Austin Chalk 2,300-20 ft., IP 170 bbl. oil per day, ½-in. choke, TP 60 psi., 37°-gravity.

San Patricio County: oil discovery—Charles A. Daubert & Walter Achning, 1 F. B. Frels, Blk. 8, Schliecher & Joseph Subd., MP & JN Delgado Grant, A-4, TD 4,848 ft., perf. 4,796-98 ft., IP 105 bbl. oil per day, ⅛-in. choke, TP 650 psi.

Webb County: new pay at Talvez—Campbell, Pearl, Calohan & Rowden A-9 O. G. Kirkpatrick, CCSD&RGNG, Sec. 59, TD 1,957 ft., perf. 1,902-10 ft., IP 99 bbl. oil per day, 45.4° gravity.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Bastrop County: Sterling M. Zindler 1 O. Duran, T. McKean League, dry, TD 2,603 ft.

Gonzales County: B. Coleman Renick 1 F. L.

Crozier, Robert Kelly Sur. A-307, dry, TD 2,517 ft.

Jim Hogg County: Sid Katz & R. H. Venable 1 Mary E. Premont, Sur. 158, dry, TD 5,125 ft.

Sun Oil Co. 2 Reuben Holbein Tract, Agua Nueva de Arriba grant, dry, TD 5,402 ft.

San Patricio County: Phillips Petroleum Co. 1 Tillery-Thos. B. Owen, R. H. Paul Subd. of Coleman-Fulton Pasture Co. Lands, Sec. 54, dry, TD 9,002 ft.

Starr County: Charles A. Daubert & Walter Achning 1 Dr. H. R. Maresh, Sur. 503, dry, TD 3,685 ft.

Wilson County: B. & G. Well Service 1 A. T. Hardin, Chas. Patton Sur., A-250, dry, TD 537 ft.

Eastern Texas

Titus County Well Ready For Completion

DALLAS.—East of the Talco field in Titus County, and thought to be on a separate closure from it, A. O. Phillips and John B. Stephens, Jr. 1 Anschults was ready for completion. On official test the well pumped 200 bbl. of oil a day from Paluxy sand at 4,387-95 ft.

Phillips and Stephens had two confirmation tests under way at last report. Number 2 Anschultz is an east offset to the discovery and 3 Anschultz is an east offset to the number 2. All wells are in the M. J. Davis Survey.

Humble Oil & Refining Co. will continue its southwest trend exploration to the Ham-Gossett field in Kaufman County. The company's 1 Trinity University extended production 1 mile when it recently completed for 320 bbl. of oil a day from the Woodbine sand at 3,359-64 ft. Humble's 2 Trinity will be a southwest offset to the extension well.

New exploration work in East Texas included the following: In Johnson County I. A. Grubman filed to drill his 1 Don Baker as a 2,600-ft. test three miles southwest of Alvarado in the Morris Survey.

Paul W. Billingsley filed to drill 1 W. D. Pace as a 4,500-ft. wildcat 11 miles southwest of McGregor in the W. H. Ranney Survey, McLennan County.

In Red River County, Goss Drilling Co. was to start this week on its 3 Thomas Ellen, a 3,500-ft. wildcat in the William Beckneel Survey.

In Smith County, L. A. Grelling filed to drill a 5,500-ft. wildcat in the W. L. McKinley Survey, 5 miles northwest of Trough. The prospector was to be the 1 E. L. Starr.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Anderson County: The Texas Co. 1 F. L. Long, D. Parker Sur., dry, TD 4,335 ft.

Collin County: Stephens Petroleum Co. 1 S. L. Adams, P. B. Huber Sur., dry, TD 7,898 ft., Ellenburger 7,496 ft.

Denton County: Bolin Oil Co. 1 Chas. Saunders, S. Noling Sur., A-968, dry, TD 2,222 ft.

Grayson County: Star Oil Co. 1 Brooks, J. W. Dexter Sur., A-341, dry, TD 8,624 ft.

Henderson County: Edson Petroleum Co. 1 S. Miller, Huntington Sur., dry, TD 5,104 ft. in the Woodbine.

Kaufman County: T. D. Humphrey 1 E. G. Fritz, R. Dickens Sur., dry, TD 7,025 ft.

Lamar County: Sussex Oil Co. 2 R. L. Lewis, Wm. Ingram Sur., dry, TD 3,605 ft.

Appalachian-Ohio

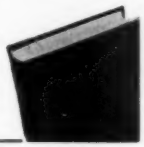
Rank West Virginia Test Completed as Dry

PITTSBURGH.—Gore district, Hampshire County, West Virginia, T. M. Pettigrew et al, completed 1 John Timbrook, rank wildcat, elevation 1,198 ft., resulting in a dry hole, Oriskany sand 7,124 ft., show of gas and salt water at 7,124 ft., and a show of gas at 7,156 ft., TD 7,175 ft. Clover district, Tucker County, Hope Natural Gas Co. 9691 Lee Spessert, elevation 2,633 ft., recorded the chert at 6,342 ft., and is drilling at 6,455 ft. Logan district, Logan County, Hope Natural Gas Co. 9677 Boone County Coal Corp., elevation 1,079 ft., reached a depth of 5,463 ft., through sandy and black lime formations with no gas reported. It was plugged back to 4,050 ft., and shot and is shut in for rock pressure test. Portland district, Preston County, Hope Natural Gas Co. 9676 Sarah J. Creamer, elevation 2,097 ft., Oriskany sand 5,243 ft., gas 5,244-5,255 ft., is testing 435,000 cu. ft.

Maryland.—Garrett County, Eberly & Snee 3 Gordon, elevation 2,509 ft., Onondaga 3,778 ft., topped the Oriskany sand at 3,922 ft. and is drilling at 3,962 ft. Mid Atlantic Oil & Gas Co. 2, Oren T. Graser, elevation 2,387 ft., Tully 2,686 ft., Onondaga 3,236 ft., reached the chert at 3,270 ft., and drilling is at 3,297 ft. Columbian Carbon Co. 1-1502 N. K. Welch, in deepening operations, encountered 1,364,000 cu. ft. of gas at 3,047 ft. Superior Oil Dev. Co. 1 Wilt & Jacobs, elevation 2,556 ft., is casing at 4,045 ft. The Tully was at 3,737 ft.

Pennsylvania.—Unity Township, Westmore-

Geophysical prospecting methods and their application in petroleum and mineral exploration



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land County, Southwest Pennsylvania, Peoples Natural Gas Co. 4003, A. J. Dotterway, elevation 2,094 ft. is fishing at a depth of 8,145 ft., No. 4008 J. R. Frola, drilling at 1,385 ft.

WEST VIRGINIA WILDCAT FAILURE

Hampshire County: Gore district, T. M. Pettigrew et al 1 John Timbrook, dry, Oriskany sand 7,124 ft., show of gas and salt water at 7,124 ft., and show of gas at 7,156 ft., TD 7,175 ft.

OHIO

R. H. Helmick et al. 1 H. W. Stanton, Lot 8, Prairie Township, Holmes County, a south offset to the 2 Patterson, made a small amount of gas on the upper Clinton at 3,476-3,517 ft., and a good oil showing in the lower sand at 3,525-41 ft. After shooting the lower 48 ft., the well gaged 140,000 cu. ft. gas and produced 115 bbl. oil in 24 hours.

B. H. Putnam et al. 1 George W. Oakes, River Lots, Belpre Township, Washington County, is probably the best completion in this new field. Oriskany sand was topped at 4,094 and drilled to 4,114 ft. where casing was set and cemented. The casing was gun perforated and the sand Hydrofraced. The natural gage of 950,000 cu. ft. increased to an estimated 7,200,000 cu. ft. after the fluid was removed.

James I. Shearer et al. are drilling a wildcat on Clyde Shantz, Lot 18, Adams Township, Washington County, an attempt to extend Putnam field 4½ miles to the northeast.

OHIO WILDCAT FAILURE

Wayne County, East Union Township: Ohio Fuel Gas Co. 1 Orr Swinehart, Sec. 11, Clinton 3,655-71 ft., TD 3,740 ft.

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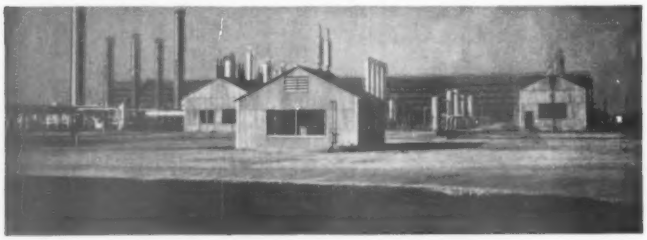

Canadian Fields

Alberta Legal Area Wildcat Recovers Oil in Viking

CALGARY.—In Alberta one wildcat discovered crude oil during the past week, two ventures struck natural gas flows.

Alberta's most recent indicated oil discovery came at a venture in the Legal area of central Alberta, some 23 miles north of Edmonton, in the vicinity of natural gas production. The oil strike was made in the Viking sand by the Overland Drilling-Saturn Petroleums-Model Oils team, during drill-stem test from 2,814-2,830 ft. That test gave up 300 ft. of clean oil and 1,500 ft. of salty water. Crew ran log, set string of production casing and will commence production tests immediately, in an effort to determine whether the well will yield oil in commercial volume.

One of this week's gas discoveries was made in the Duhamel area, at a well located ¼ mile from current Devonian oil production. The gas strike came in the quartzite, a section of the Lower Cretaceous formation, at Mill City-Socony 3 Flint. Drill-stem test from 4,192-4,208 ft., yielded a gas flow to surface in 30 seconds, at estimated rate 4,000,000 cu. ft. daily, and flowed drilling mud in 34 minutes. Crews was pulling drill-pipe at last report, and will continue coring and testing. This venture is located about ½ mile south of the group's No. 1 well which indicated oil discovery in the quartzite earlier this year and completed as a Devonian producer having found oil in two zones of that formation.

The other gas strike, classed as either a discovery or 3½-mile extension, was made in the Bow Island sand at 2 Steveville Developments well. The 2 Steveville Developments is located around 100 miles east of Calgary and 3½ miles northeast of the A-1 Sweetgrass-Maygill discovery well in that area. Drill-stem test from 2,730-2,770 ft. flowed gas at rate 2,600,000 cu. ft. daily.

CANADIAN SUCCESSFUL WILDCAT

Ridgeway-Selbany 10-18 Buffalo Park 10-18, LSD 10 18-44-8w4, TD 2,390 ft., capped gas well.

CANADIAN WILDCAT FAILURES

Western 11-6 Brosseau, LSD 11-56-12w4, TD 2,126 ft.

Seaboard et al 1 Cossack, LSD 10 9-60-17w4, TD 3,497 ft.

EASTERN CANADA

Newfoundland.—At St. Paul's Inlet, on the west coast of Newfoundland, drilling by a Boston syndicate headed by John Fox, started several months ago, is well advanced, and completion of the first well is expected early in June. Oil showings were first discovered at St. Paul's many years ago, but several attempts have failed to develop commercial production. Mr. Fox arrived in St. John's, the provincial capitol, recently, to confer with government officials regarding development work.

Ontario.—In the Tillsonburg area, Oxford County, Tri-County Gas & Oil Co., drilling on the John Stier farm, has finished a second well which, shot with nitroglycerin, developed a good flow of sweet gas. Additional drilling will be undertaken in the area.

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Permian Basin

Deepest Permian Producer Completed in Andrews

MIDLAND.—Magnolia Petroleum Co. 1 University, Ellenburger discovery northeast of Andrews, made official completion gage of 555 bbl. of 44°-gravity oil a day through ½-in. choke, from perforations at 13,840-84 ft.

Magnolia's discovery is approximately 18 miles north of Ralph Lowe 1-K Fasken, 43-41-T1N-G&MMB&A, on the southeast tip of Midland Farms (Permian) pool of southeast Andrews County. The 1-K Fasken is the first of 7 Ellenburger wildcats to be drilled in that area, with contract depth to 14,000 ft.

Drilling program on the seven wells was hinged on completion of a deal with Texas Eastern Production and Forest Oil Corp., involving some 23,000 acres extending from the Midland Farms field into northeast Ector County.

Coroco Drilling Co. 1 Atlas Life, western Terry County wildcat, had tests scheduled down the hole from the Permian to the Devonian. The lower zone flowed oil on drill-stem test around 12,700 ft.

Perforations at 10,100-20 ft. yielded 9 bbl. of oil an hour after acid treatment, while perforations at 10,050-60 and 10,055-75 ft. developed 7 bbl. of oil an hour natural.

Southern Upton County gained a flush Strawn discovery at a reworked Ellenburger failure, originally drilled dry to 11,260 ft. The new producer is Oscar Bourg & Clark Development Co. 2 University, 4 miles southwest of Rankin in 18-15-University Lands. At last report the well was testing on various sized chokes. With chokes averaging 24/64-in., the well gaged 550 bbl. of new oil in 48 hours, with no water.

In Mitchell County, 15 miles southwest of Colorado City, S. F. Hurlbut 1 Wallis developed 30 ft. of oil and gas-cut mud and 70 ft. of heavily oil and gas-cut mud on a drill-stem test in the Ellenburger between 7,606-23 ft.

Wilshire Oil Co. 23-130 McElroy moved the Wilshire-Ellenburger one location north with a completion potential of 3,477 bbl. daily. The potential was based on a 10-hour gage of 1,450 bbl. of oil through a 1-in. choke on tubing, from pay at 12,067-225 ft., total depth. Top of pay was 12,078 ft., on elevation of 2,841 ft., derrick floor.

Superior Oil Co. 4-16 Windham, southwest Midland County discovery, prepared to complete after flowing 114 bbl. of oil in 90 minutes on a drill-stem test in the Ellenburger from 13,178-245 ft. Oil reached the surface in 30 minutes, and made the above gage through ⅜-in. bottom-hole choke.

Standard Oil Co. of Texas 2-1 Wilson, Pecos County wildcat west of the Yates field, topped the Ellenburger, by samples, at 9,126 ft., minus 6,125 ft. and drilled shows of oil and gas. Drill-stem test from 9,144-59 ft. was under way.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Crane County: Magnolia Petroleum Co. 18 Katie W. Lea, 22-32-PSL, TD 10,932 ft., elev. 2,591 ft., Pennsylvanian 6,950 ft., IP pumped 62 bbl. 32°-gravity oil.

Dawson County: Seaboard Oil Co. 1 L. I. Dean, 39-34-T5N-T&P, TD 6,893 ft., elev. 2,914 ft., Spraberry 6,650 ft., IP 161 bbl. 38°-gravity oil, ⅜-in. choke, TP 175 psi., GOR 900 cu. ft.

Upton County: E. Constantin, Jr. 1 D. M. Oldham, Jr., 12-B-CCSD&RGNG, TD 7,829 ft., elev. 3,230 ft., Spraberry 6,903 ft., IP 261 bbl. 38°-gravity oil, ½-in. choke, TP 100 psi., GOR 647 cu. ft.

Winkler County: Humble Oil & Refining Co. 2 R. M. Evans "C," 39-73-PSL, TD 8,923 ft., elev. 3,195 ft., Mississippian 8,530 ft., IP pumped 8 bbl. 40°-gravity oil.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Dawson County: Seaboard Oil Co. 1 J. R. Weaver, 68-35-T5N-T&P, dry, TD 9,602 ft., Clear Fork 5,680 ft., reef 9,490 ft.

Glasscock County: Nelson Bunker Hunt 1 J. T. Daniels, 10-35-T5S-T&P, dry, TD 7,442 ft., elev. 2,692 ft., Spraberry 6,280 ft., lower Spraberry 7,360 ft.

Plymouth Oil Co. 4 S. C. Currie, 43-32-T4S-T&P, dry, TD 3,196 ft., Clear Fork 3,028 ft.

King County: Burdell Oil Co. 1 W. R. Ross, R. M. Thompson Sur., dry, TD 5,522 ft.

Martin County: Shell Oil Co. 1 Elona Slaughter, 77-B-Bauer & Cockrell Sur., dry, TD 12,075 ft., Pennsylvanian 10,495 ft., Mississippian 11,190 ft., Ellenburger 12,010 ft.

Midland County: The Texas Co. 4 Scharbauer "D," 28-40-T2S-T&P, dry, 10,858 ft., elev. 2,843 ft., Pennsylvanian 10,481 ft.

Pecos County: Bell Petroleum Co. 31-11 State National Bank, 11-140-T&STL, dry, TD 4,792 ft. in granite wash.

Hunt Oil Co. 39 Elsinore, 28-C-GC&SF, dry, TD 1,242 ft.

Sterling County: LeMay Oil Co. 1 Lester Foster, 28-11-SPRR, dry, TD 1,662 ft., elev. 2,352 ft., San Andres 1,076 ft.

Norfitt Petroleum Corp. 1 Hildebrand, 28-12-SPRR, dry, TD 1,860 ft.

Sutton County: Republic Natural Gas Co. 1 Vanderstrucken, 38-7-TW&NG, dry, TD 5,300 ft., elev. 2,265 ft., Strawn 4,800 ft., Ellenburger 5,195 ft.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCAT

Lea County: Barney Cockburn 5 Corbin "A," 9-18s-33e, TD 4,305 ft., elev. 3,977 ft., Yates sand 3,443 ft., IP pumped 12 bbl. 36°-gravity oil.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Eddy County: Continental Oil Co. 1 W. H. Bass, 5-22s-21e, dry, TD 5,889 ft., elev. 5,511 ft., Pennsylvanian 3,815 ft., Montoya 4,690 ft., Ellenburger 5,088 ft.

DeKalb Agricultural Association 1 State-Buennabel, 36-24s-28e, dry, TD 7,795 ft., Delaware lime 2,658 ft., sand 2,698 ft.

South Louisiana

Plaquemines Parish Well Completed For Oil

NEW ORLEANS.—Woods Oil and Gas Co. has potentialed the 1 Dr. B. R. Slater, 6-18s-27e, Plaquemines Parish, for 80 bbl. of 42°-gravity oil per day on a 10/64-in. choke. The well was drilled to 11,337 ft. and completed through perforations 11,230-241 ft. Tubing pressure was 3,200 psi. and gas-oil ratio 33,000-1. Seven and five-eighths casing was cemented on bottom with 2½-in. tubing set at 11,208 ft. On a previous test the well flowed 73 bbl. of oil on a 10/64-in. choke with tubing pressure 3,625 psi., gravity 35.9°.

Latest drill-stem test on Progress Petroleum Co. 1 Juban, Livingston Parish (OGJ, 5/26/52, p. 61) with perforations from 8,591-97 ft. showed an estimated 200 bbl. of fluid daily, being 130 bbl. of oil and 70 bbl. of salt water in ¼-in. by ½-in. chokes. Working pressure was 1,700 psi., gravity 45°, gas-oil ratio 2,000-1. Additional tests are planned before completing the 9,013-ft. well located in 4-7s-3e.

Gage of 94.23 bbl. of 47.4°-gravity distillate plus 7,838,000 cu. ft. of gas daily through a 22/64-in. choke was reported on Superior Oil Co. 1 Rockefeller State Lease 2,038, 4-16s-3w, Cameron Parish. The new gas-distillate discovery, drilled to a total depth of 12,030 ft., was completed through perforations from 11,242-250 ft. with tubing pressure registering 3,385 psi., casing pressure 3,725 psi., and gas-liquid ratio 83,179-1. Operator is continuing operations on confirmation test known as 2 Rockefeller, located about 1 mile east of the discovery and drilling below 11,700 ft.

Magnolia Petroleum Co. has abandoned its Magnolia 4-C in Allen Parish. Open-hole swabbed from 11,915-50 ft. brought trace of distillate which developed into a flow of 100 per cent salt water. Failure is located in 32-3s-9e.

SOUTH LOUISIANA WILDCAT FAILURES

Iberville Parish: John L. Loeb 1 Slack Bros., Inc., 7-7s-10e, dry, TD 10,017 ft.

Plaquemines Parish: Kerr-McGee Oil Industries B-1 St. La. 1230, Blk. 36, near Breton Island, dry, TD 5,003 ft.

Louisiana-Ark.

Third Completion Recorded For Ross Bayou Field

SHREVEPORT.—The third completion for new Ross Bayou field in Concordia Parish has been announced at H. L. Hunt Co. and Gulf Refining Co. 3 C. F. Farrar, SW NE 4-6n-7e. The well flowed 168 bbl. of 43°-gravity oil daily from perforations 5,608-14 ft. in the Wilcox on 9/64-in. choke. Total depth is 6,000 ft. with gas-oil ratio 300:1.

The fourth Wilcox producer is assured at 1 Burrill-Sontag unit, west offset to the field discovery. Bottomed at 6,004 ft. with 5½-in. pipe cemented at 5,675 ft., it was perforated at 5,081-84 ft. and 5,087-90 ft. On 3-hour test it produced 140 bbl. of high gravity oil daily flowing through ⅛-in. tubing choke and is shut-in awaiting official test.

The discovery well of Ross Bayou field is Barnett Serio 1 A. M. Burill in 4-6n-7e and was officially gaged for 187 bbl. of 39.5°-gravity oil daily on 10/64-in. choke from 5,098-5,102 ft. in Wilcox.

To date only one dry hole has been reported for the new field. Two other tests are drilling towards completion and a location is still waiting for operations to start. The dry hole is the southeast diagonal offset to the discovery well of the new field, located north of Lismore in east-central Louisiana not far from the Mississippi River.

A cycling plant may be erected if production warrants in the new Swartz gas-condensate field in Ouachita Parish, northeastern Louisiana. W. C. Feazel and Monla Gas Co., Inc., will begin operations immediately at 2 Breece Lumber Co., 200 ft. from north and west lines of SW¼ 11-18n-5e, confirmation test for new Swartz field. The discovery well, 1 Breece Lumber Co., SW SW SW NW 3-18n-5e, is waiting on official test after flowing 8,000 M.c.f. of gas per day plus unestimated amount of condensate through ¾-in. tubing choke on a recent company

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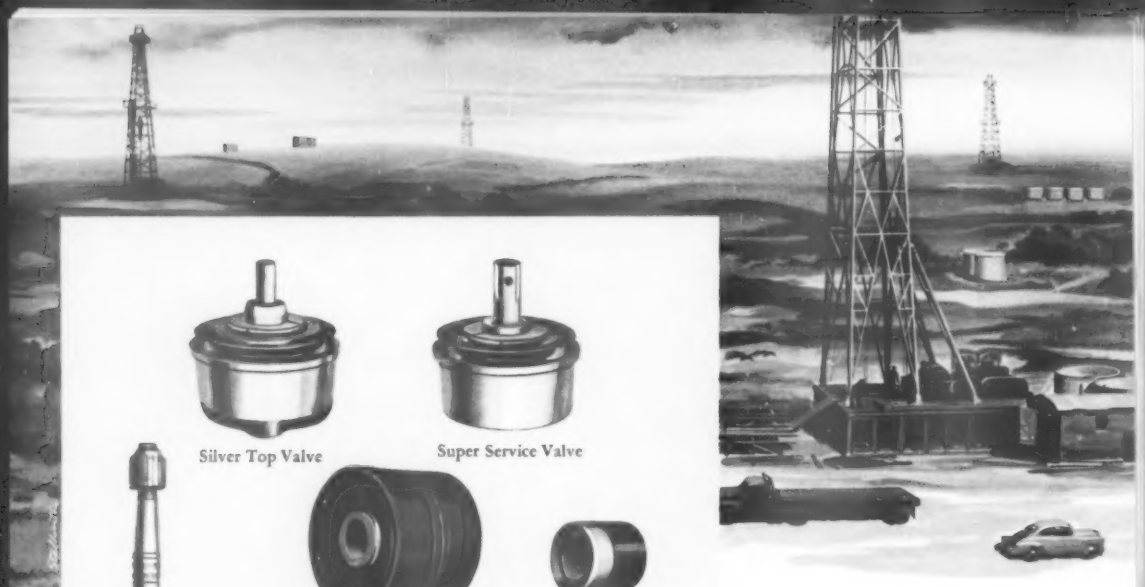

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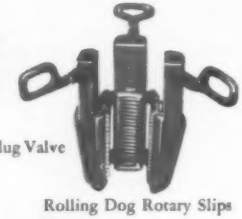

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test. Production is from 7,343-69 ft. opposite Bodcaw sand.

Arkansas.—Curtis Kinard is setting pump unit prior to production tests of Cotton Valley perforations at 1 Taylor, C SE NE NW 28-18s-12w, indicated discovery north of Strong, Union County. An unestimated amount of Cotton Valley oil was swabbed prior to setting pumping equipment. Bottom of hole is at 6,402 ft. in Smackover lime with 5½-in. casing cemented on bottom.

LOUISIANA WILDCAT FAILURES

Bossier Parish: Jas. R. Nowery et al 1 G. D. Goodwin, C NW SW SW 30-23n-12w, dry, TD 2,833 ft.

Franklin Parish: D. E. Vasser et al 1 West Virginia Timber Co., C SW NW SW 23-15n-7e, dry, TD 4,450 ft.

Morehouse Parish: Justiss-Mears Oil Co. 1 Evans, 955 ft. N and 2,392 ft. W SEc 15-22n-7e, dry, TD 4,616 ft.

Texas Gulf Coast

Third Pay Zone Opened In Goree Field Well

HOUSTON.—Skelly Oil Co. opened third producing zone in Goree field, Bee County, at the 1 Alma Knight, located in Thomas B. Barton Survey, A-83, 3 miles west of Mineral. Well is flowing at rate of 96 bbl. of 23°-gravity oil from perforations in Frio sand at 2,566-80 ft. with 42 shots. Gas-oil ratio was estimated to be 200-1. Hole was drilled to depth of 7,605 ft. and plugged back to a depth of 2,681 ft. with a 5½-in. production string cemented at 2,681 ft.

Discovery well for Goree field was completed in October 1949, for 61 bbl. of 40.4°-gravity oil from Luling sand (Wilcox) through perforations at 7,199-7,202 ft. Gas-oil ratio was 5,344-1. Other pay zone was discovered by 1 G. W. Goree in the Slick sand of the Wilcox from perforations 7,014-26 ft. Initial potential was 30,000,000 cu. ft. of gas per day.

Deep Rock Oil Corp. has tested gas and distillate with no gage at 1 Melaine Diebel, 4 miles west of Arnackeville field production in Dewitt County. Test was on perforations at 8,156-70 ft. and perforations at 8,183-94 ft. Previous test on perforations 8,187-98 ft. with a maximum working pressure of 1,900 psi., well flowed at rate of 1 gallon of distillate per hour. Bottomhole flowing pressure was 2,700 lb. Location is in Munford House Survey, A-226.

Southern Minerals Corp. has recovered oil on a drill-stem test from new sand at 2 Edwin Keller, 2 miles southwest of Tivoli, Refugio County. Recovery was 2,300 ft. of pipe-line oil on a 20-minute test from 5,213-16 ft. with a working pressure which built up to 19 psi. and bottom-hole pressure which built up to 2,100 psi. Location is in Joshua Davis Survey, A-17. 933 ft. northeast of the discovery well 1 Edwin Keller.

Superior Oil Co. has potentialed the tubiing completion in the 10,400-ft. lower Frio zone for 247,000 cu. ft. of gas per day on absolute openflow in 1 Mae C. McDonald, dual gas-distillate discovery 3 miles southeast of Pledger and 7 miles northeast of Old Ocean in Brazoria County. Tubing completion flowing through annulus between 3-in. tubing set at 10,047 ft. and 1½-in. tubing at 10,050 ft. from perforations 10,363½-10,391½ made 64.5°-gravity distillate under gas-liquid ratio of 5,500-1. Shut-in pressure is 5,055 psi., absolute. The upper casing sand completion potentialed 81,000,000 cu. ft. of gas per day on open flow with gas-liquid ratio of 7,500-1 and flow of 69.3°-gravity distillate. Shut-in pressure registered 3,935 psi., absolute. Location is in Zeno Phillips Survey A-118.

Also in Brazoria County, The Texas Co. Solon L. Reeves et al, 11,500-ft. wildcat test, has showed some gas apparently from a sand logged at interval 10,096-100 ft. Crew closed rams on blow-out preventer after gas kicked 10.9 lb. mud. Crew opened after 200 pounds pressure against preventer declined and circulation has been continued after conditioning mud. Hole is bottomed at 10,316 ft. in sand and shale, and is 3 miles north of Chenango field and 8½ miles northwest of Danbury, in Stephen F. Austin Survey 8, A-25.

In Liberty County, 6½ miles southwest of Liberty in northwest portion of South Dayton field The Texas Co. has requested a discovery allowable for 4 William Duncan Welder completed in the 8,000-ft. zone. New pay opener was potentialed for 273.52 bbl. of 36.7°-gravity oil per day on 12.64-in. choke through perforations at 8,094-8,140 ft. Well flowed on initial potential test under tubing pressure of 980 psi., with gas-oil ratio of 553-1. Well was drilled to 8,943 ft. and plugged back to 8,170 ft. with 5½-in. casing cemented at 8,190 ft. and 2-in. tubing swung at 8,063 ft. Well is in William Duncan Survey.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Bee County: gas discovery—Stanolind Oil & Gas Co. 1 J. H. Andrews, A. Jackson Davis & James G. Morrow Sur., TD 9,020 ft., perf. 7,354-64 ft., IP 11,250,000 cu. ft. of gas per day, open flow.

Jefferson County: new pay at Big Hill—Deep South Oil Corp. 2 Second Bank & Trust Co., T&NO RR Sur., Benson Subd., Blk. 18, Sec. 164, TD 10,233 ft., Marginulina 8,729-33 ft., IP 210 bbl. oil per day, 8/64-in. choke, 33.6° gravity.

Karnes County: gas-condensate discovery—Brazos Oil & Gas Co. 1 Rudolph Kruse, Victor Blanco Sur., A-3, TD 7,521 ft., perf. 7,208-14 ft., IP 99 bbl. condensate per day, 60° gravity.

Refugio County: oil discovery—Southern Minerals Corp. 1 Edwin Keller, J. R. Tileston Sur., A-289, TD 5,080 ft., perf. 5,075-77 ft., IP 43 bbl. oil per day, 7/64-in. choke, 44.5° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Christie Hewit-Estate of J. R. Dougherty B-2 K. D. Roche "B," Thos. Ranuelo & Stephen Sur., A-3, dry, TD 5,150 ft.

Chambers County: Lloyd H. Smith, Inc., 1 Claude Williams unit, A.B.J. Winfree Sur., A-306, dry, TD 8,306 ft.

DeWitt County: Yarborough, Zoch & Flato Drilling Co. 1 Frank J. Tam, James Kimberling Sur., A-283, dry, TD 7,238 ft.

Goliad County: O. Neathery, Jr., et al 1 S. E. Cole, Blk. 27, Range 4, Goliad Town Tract, dry, TD 6,040 ft.

Hardin County: General Crude Oil Co. 1-X Kirby Lumber Co. et al, James M. Clayton Sur., A-140, dry, TD 8,415 ft.

Karnes County: H. H. Howell 1 Sam Mogzygemba, Andres Hernandez Grant, dry, TD 6,025 ft.

Live Oak County: Pagenkopf & Chenoweth 1 Schultz Livestock Co., CCSD&RGNG Sur. A-696, dry, TD 2,138 ft.

Montgomery County: F. A. Callery, Inc., 1 Mary Lena Castle, Raleigh Rogers Sur., A-33, dry, TD 4,900 ft.

Newton County: H. J. Chavanne, Trustee, 1 H. B. Funchess, Jr., Armon Davis Sur., A-111, dry, TD 7,762 ft.

San Jacinto County: Sunray Oil Corp. 1 Emma Bell, J. D. Martinez Sur., A-34, dry, TD 11,452 ft.

Victoria County: Plymouth Oil Co. 2 R. H. Welder, SA&MG RR Sur., dry, TD 9,454 ft.

Wharton County: John B. Coffee 1 Wallace & Willis, P. J. Poole Sur., A-614, Sec. 6, dry, TD 8,265 ft.

Sam G. Harrison 1 Louisa C. Peterson, WC RR Co.—J. A. Hamilton Assignee Sur., Sec. 38, A-589, dry, TD 5,375 ft.

S. H. Howell Drilling Co. 1 Kountze & Stewart, P. J. Poole Sur., A-613, dry, TD 7,015 ft.

D. M. Wallace 1 F. A. Orsak, SA&MG RR Sur., A-333, dry, TD 6,202 ft.

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Central Area

ILLINOIS

Devonian production of the Raccoon Lake field, 3 miles northeast of Centralia, Marion County, is being extended a half mile east where Eddie M. Self is testing his 1 S. A. Dunbar community, NW NW SW 2-1n-1e. The well flowed by heads at rates of 70 to 80 bbl. per hour. Pay zone is open at 3,374-80 ft. with bottom of the hole at 3,401 ft. The field, opened in 1949, also produces from the Cypress, lower O'Hara, Rosiclare, and McClosky zones.

INDIANA

Three new operations are getting under way in the new east extension area of the Monroe City pool, southwest of Monroe City, Knox County. The new area, ¾ mile from other production, was opened by Affeld Oil Co. and associates 1 McCoy, in the SE Military Donation 13-2n-9w, which swabbed and flowed 210 bbl. of oil in 6 hours from Rosiclare lime, perforated at 1,553-62 ft. The new operations, all in the same donation, include one by operators of the discovery well, and two by Cline & Lambert.

WESTERN KENTUCKY

Discovery of another producing area, located in the northwest tip of Henderson County, 4 miles south of Mount Vernon, Ind., appears to have been made by George S. Engle at his 1 Flack. The well, in 13-Q-20, and 1½ miles east of the Powells Lake field, in northern Union County, found good saturation in the O'Hara zone, logged at 2,643-53 ft. In a drill-stem test, open 2 hours, the well gassed in 25 minutes, and filled 480 ft. of clean oil and 90 ft. of oil and gas-cut mud. Indicated bottom-hole pressure was 675 psi. Hole is being deepened to the McClosky.

EASTERN KENTUCKY

A new pool for eastern Elliott County seems assured as Court and Shaeffer et al 1 Issac Ison swabbed from 20-30 bbl. of pipeline oil in first tests. Located on Anderson Branch of Newcombe Creek, the test is bottomed in Weir (Mississippian) sand at 850 ft. On drilling in well filled to with 50 ft. of top of hole. Well is about 1 mile south of Burke Dome pool and about 1 mile north of town of Isonville.

In western Elliott County Raymond Long et al have a dry hole at their 1 Nealy Gray on the Wyatt dome. Located in 16-T-76 test was dry in top portion of Corniferous lime topped at 1,299 ft. Electing to go to and through the Big Six Silurian sand operators likewise found same dry. Hole was bottomed at 1,490 ft.

MICHIGAN

Production flow tests were being continued at Sun Oil Co. 1 Iutzi et al, NW SW SW 5-19n-3w, Hamilton Township wildcat Richfield oil discovery well, Clare County. Well has been acidized with a total of 7,000 gal. and flowed as much as 226 bbl. of net oil and about 60 bbl. of salt water on early 24-hour test. Well has been averaging about 70 bbl. of oil and about 10 per cent watercut daily on more extended flow tests through a ¼-in. choke. Wildcat is bottomed out at 5,210 ft., plug-back depth from 5,380 ft. TD.

Sun Oil Co. Unit 1 Iutzi-Woods et al, C SE 6-19n-3w, first Stray-Marshall gas test in this area, was cased and ready for completion in the objective gas pays this week. Stray was logged at 1,392 ft. A drill-stem test of this section, from 1,391-1,403 ft. showed 483,000 cu. ft. of gas on a 1-hour test. Long string of casing was run and cemented at 1,465 ft. Biggest gas pay is expected to be logged in the Marshall section, where the 1 Iutzi et al showed in excess of 3,000,000 cu. ft. when tested en route to the deeper pays.

Two new wells in Headquarters field, Roscommon County, appeared to verify the presence in this area of both a Detroit River sour zone oil reserve and a Richfield reserve of importance. The Detroit River well was E. V. Hilliard E-2 State-Roscommon, NE NW NW 29-21n-3w, Roscommon County, which was drilled out dry in the Richfield, but was completed in the shallower pay, at 4,922-28 ft., and flowed as much as 140 bbl. of oil a day, restricted, after acid treatment with 2,500 gal. This was an old Stray sand gas well deepened. Sun Oil Co. reported first 24-hour pump test after acid treatment in the Richfield at its A-1 State-Roscommon, NW NE SW 33-21n-3w, an old Dundee well which was deepened. This well pumped a total of 132 bbl. of net oil and about 58 bbl. of water from the Richfield at 5,339 ft., total depth. Extensive swab tests were run before pump unit was set.

ILLINOIS WILDCAT FAILURES

Clay County: Calvert Drilling, Inc. 1 Wilson, NE NW SE 29-4n-8e, dry, TD 3,125 ft.

Mohawk Drilling Co. 1 Givens, NW NE SE 4-4n-5e, dry, TD 2,653 ft.

Clinton County: H. V. Spires 1 Erlinger, NW NW NW 35-2n-3w, dry, TD 2,654 ft.

Al Schierman 1 Voss, NW NW SE 34-2n-3w, dry, TD 1,240 ft.

Douglas County: Walter Henigman 1 Baxter, NW SE SW 32-16n-14w, dry, TD 401 ft.

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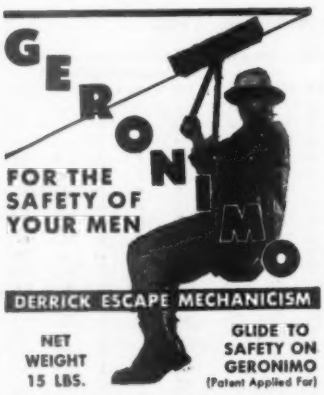

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Jasper County: Cullum & Lawhead 1 Ping, SW SW SE 12-7n-10e, dry, TD 2,499 ft.
Lawrence County: Eureka Drilling Co. 1 Casey-Jones, NE NE SW 9-4n-11w, dry, TD 1,789 ft.
Macon County: H. C. Herring 1 Hays, SE NE NW 33-17n-2e, dry, TD 2,101 ft.

(Continued on page 169)

Mississippi

Major Gas Strike Apparent in Forrest

JACKSON.—Ohio Oil Co. appears to have a major gas discovery in its 1 Coleman-Powe, 5-1s-12w, in the Maxie area of southern Forrest County. The wildcat was drilled to a total depth of 9,006 ft. in Lower Cretaceous. Log and cores indicate gas sands at 7,190-7,208 and 7,306-40 ft. in the first sands below the base of chalk; also 8,175-80, 8,264-74, and 8,320-68 ft. in upper part of lower Tuscaloosa. This makes a total of 117 ft. of gas-sand over-all. The net effective gas sand will be slightly less.

Casing was run to 8,483 ft. and perforated 8,318-41 ft. On drill-stem test of these perforations using 5.8-in. bottom and ¼-in. top chokes and 3,000 ft. of water cushion, the well flowed gas and salt water. The water cushion hit the surface in 10 minutes and top pressure built up to 1,900 psi. in 1 hour. Operators will squeeze perforations and test same sand again. After examining log and core descriptions it was felt that a defective cement job is the cause of the salt water produced on drill-stem test.

Feeling exists that this well is probably the best discovery that has been made in Mississippi in several years, and is most significant in that it opens up the north flank of the Wiggins high as an interesting area to explore.

Southeastern Drilling Co. 1 Eley et al, 19-8n-8e, had a comparatively short Cotton Valley section and then went into fractured dolomite at 9,620 ft., which is thought to be Knox (Ordovician). Drilling continuing below 9,807 ft.

Gulf Refining Co.'s deep test in Baxterville field, Lamar County, the 25 Andrews, 6-1n-16w, recovered 17¼ ft. of grey, hard sandstone with slight fluoresence in core 11,312-347 ft. The next core, 11,347-360 ft. was hard limestone and shaly limestone with no show. A 20-minute drill-stem test was then run at 11,314-360 ft. with recovery being 2,430 ft. of salt water with sulfur odor. Operators are drilling ahead below 11,500 ft.

Lion Oil Co.'s deep Smackover wildcat, 2 Denkmann, 22-7n-4e, Rankin County, has cemented 5-in. casing at 15,773 ft. No announcement has been made as to when testing operations will start. Original plans were first porous sand section from 15,997 ft. to total depth.

MISSISSIPPI WILDCAT FAILURE

Wilkinson County: Norman Germany — B. Serie 1 Judson Ratliff, 36-5n-2w, dry, TD 7,009 ft.

ALABAMA WILDCAT FAILURE

Escambia County: J. L. Duffy-J. P. Harrington 1 J. S. Nolin, 1-1n-6e, dry, TD 6,834 ft.

FLORIDA WILDCAT FAILURE

Collier County: Humble Oil & Refining Co. 2 Collier Corp., 34-50s-26e, dry, TD 5,900 ft.

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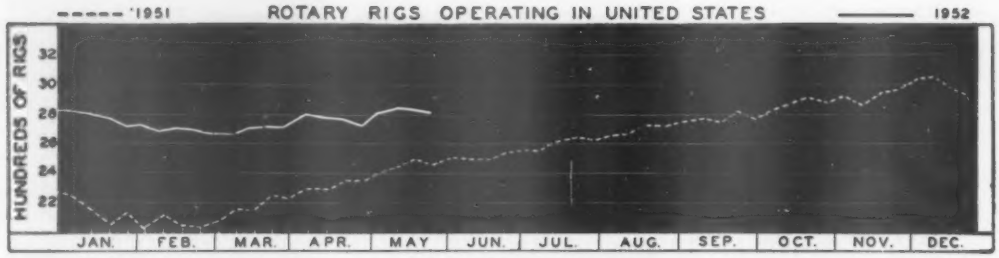
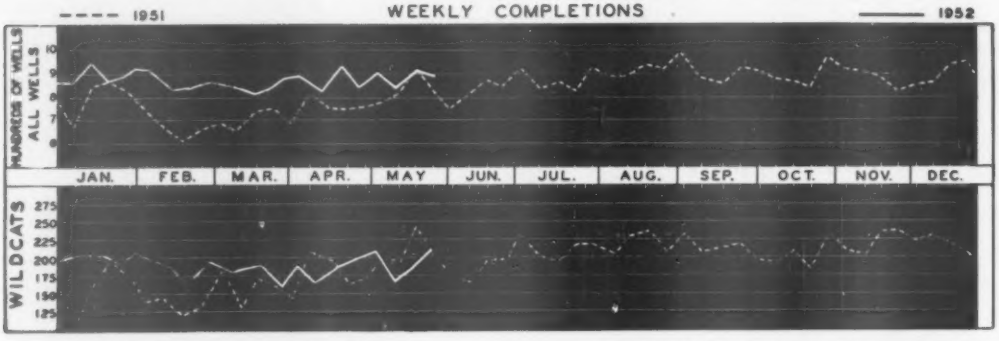




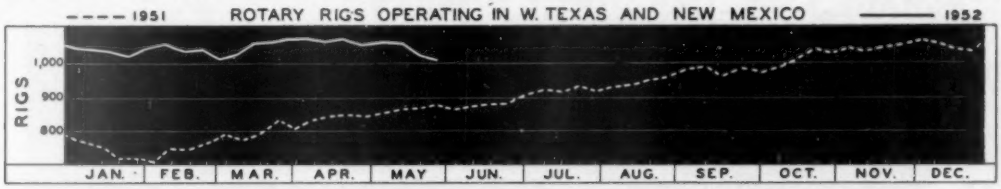
CURRENT STATISTICS

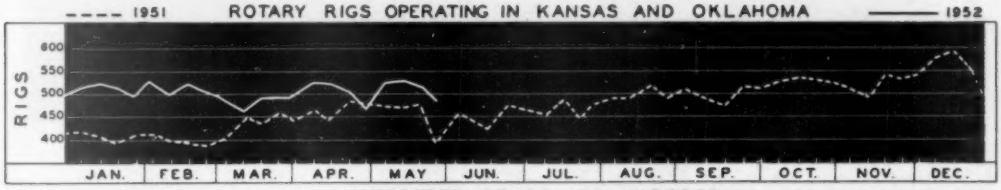
EXPLORATION

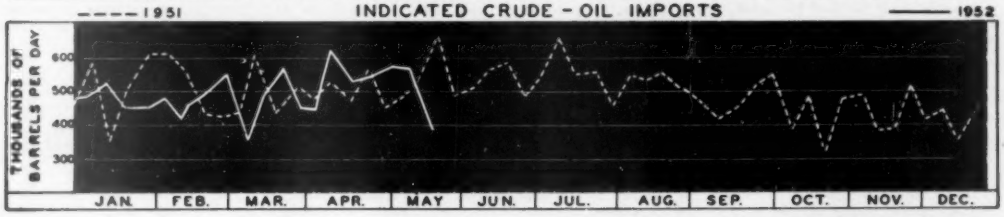
WEEKLY WELL COMPLETIONS . . . WEEK ENDED MAY 24, 1952

	Total of all wells					May 24		Wildcat completions and discoveries					Cumulative total, 1952				
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	20	10	0	*10	24,000	266	166	0	0	0	0	0	0	0	0	0	0
Pennsylvania	31	13	5	13	63,200	661	440	0	0	0	0	0	0	0	0	2	2
West Virginia	15	1	12	2	49,502	262	218	0	0	0	1	1	0	0	2	2	4
Ohio	13	3	3	†7	37,634	361	316	0	0	0	1	1	0	0	5	5	10
Indiana	19	5	1	13	33,009	423	382	0	0	0	9	9	14	0	2	130	146
Kentucky	37	10	5	22	68,006	504	363	0	0	0	7	7	9	0	0	87	96
Illinois	40	15	0	25	90,615	593	687	0	0	0	11	11	7	0	0	157	164
Michigan	23	12	0	11	60,527	276	264	1	0	0	8	9	12	0	1	97	110
Kansas	91	44	3	†44	310,415	1,908	1,660	5	0	1	16	22	41	0	6	315	362
Nebraska	5	1	0	4	19,565	97	113	0	0	0	3	3	4	0	0	52	56
Oklahoma	92	55	2	‡35	359,967	2,389	2,211	3	0	0	14	17	43	1	7	252	303
Texas	356	223	16	117	1,679,017	7,165	6,427	22	1	2	75	100	336	30	53	1,490	1,909
North Central (Dist. 7-B & 9)	130	69	1	§60	400,821	2,221	1,957	12	0	1	34	47	193	1	18	632	844
West (Dist. 7-C & 8)	121	96	1	24	702,612	2,223	1,962	4	0	0	11	15	61	0	3	253	317
Panhandle (Dist. 10)	6	6	0	0	17,751	273	279	0	0	0	0	0	1	0	3	20	24
Eastern (Dist. 5 & 6)	27	11	3	13	162,933	387	457	0	0	0	7	7	12	3	0	87	102
Gulf Coast (Dist. 2 & 3)	41	17	9	15	246,376	1,070	900	3	1	1	15	20	42	18	13	217	290
Southwest (Dist. 1 & 4)	31	24	2	5	148,524	991	872	3	0	0	8	11	27	8	16	281	332
Louisiana	42	25	0	17	290,262	883	770	0	0	0	4	4	17	8	5	95	125
Northern	22	12	0	§10	83,786	469	381	0	0	0	3	3	7	0	5	41	53
Southern	20	13	0	7	206,476	414	389	0	0	0	1	1	10	8	0	54	72
Arkansas	7	6	0	1	19,551	149	142	0	0	0	0	0	4	0	0	22	26
Mississippi	2	0	0	2	15,739	145	110	0	0	0	1	1	8	1	1	55	65
Southeastern States	2	0	0	2	12,734	22	33	0	0	0	0	0	1	0	1	11	13
Montana	7	4	2	1	14,275	90	82	0	0	0	0	0	2	0	1	20	23
Wyoming	19	12	0	7	80,697	261	258	1	0	0	5	6	12	0	2	43	57
Colorado-Utah	8	2	1	5	41,301	197	97	0	0	1	5	6	11	0	6	67	84
New Mexico	23	17	1	5	143,539	389	264	1	0	0	2	3	16	0	1	40	57
California	40	30	0	10	167,404	1,014	815	1	0	0	8	9	39	0	1	186	226
North Dakota	4	4	0	0	39,308	16	2	1	0	0	0	1	3	0	0	4	7
Miscellaneous	0	0	0	0	0	27	16	0	0	0	0	0	0	0	8	11	19
Total United States	896	492	51	353	3,620,267	18,098	15,836	35	1	4	170	210	579	40	102	3,143	3,864
Total previous week	908	481	74	353	3,754,086	....	....	30	3	5	143	181	544	39	98	2,973	3,654
Total May 26, 1951	824	410	71	343	3,067,245	....	....	41	0	8	152	201	557	30	108	2,847	3,542

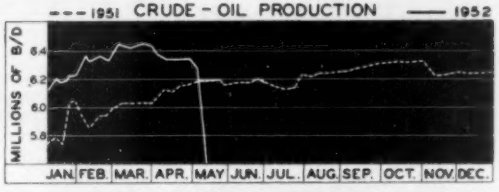
Service wells included: *10, †2, ‡3, §1.

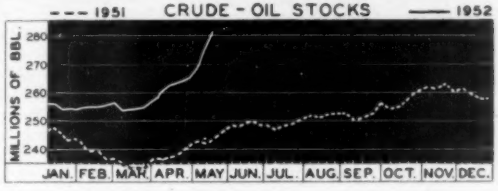






Owing to conditions brought about by the strike in the oil industry, which is now coming to an end, complete data on daily average crude-oil production in the United States for the week ended May 24, 1952, are not available.



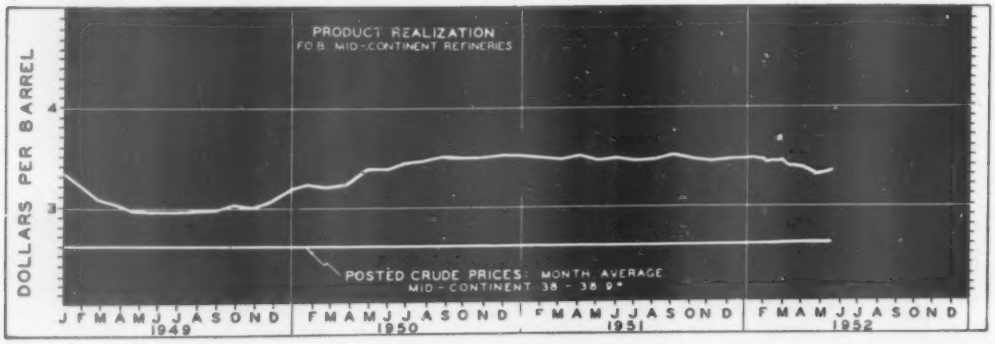


CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	May 17, '52	May 10, '52	May 19, '51
Pennsylvania Grade	2,485	2,461	2,102
Other Appalachian	2,057	1,999	1,578
Illinois, Indiana, Michigan	12,049	12,566	10,667
Arkansas	3,136	3,223	2,424
Louisiana	15,108	15,114	14,067
North	2,716	2,924	2,766
Gulf	12,392	12,190	11,301
Mississippi	3,336	3,599	2,978
New Mexico	7,480	7,414	6,691
Oklahoma and Kansas	44,022	42,858	38,158
Texas	138,640	134,117	112,821
East Texas proper	13,353	12,774	(†)
West Texas	61,644	59,481	(†)
Texas Gulf	30,781	29,863	(†)
Other Texas	32,862	31,999	(†)
Rocky Mountain	15,965	15,726	14,458
California	30,094	30,199	30,410
Foreign	7,409	7,621	8,029
Total	281,781	276,897	244,383

*Bureau of Mines. †Not comparable with current week.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
4
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields for current week are estimated. Realization averaged $3.34 for week ended May 17, $3.33 for previous week, and $3.47 for May 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of May 28, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅜-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11⅜-11½	13.5-13.75	11¾-12
42-44 w.w. kerosine	8¾-9	10-10.1	9
No. 2 straw fuel oil	7¾-8	9-9.25	8
No. 6 residual	$1.30-1.40	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.6	6.1	6.35

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29
200 vis., No. 3 neutral, 0-10 pp.	16.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX
Mid-Continent

132-134 A.M.P.	5.5

EFFECTS of the strike on petroleum product markets have been to tighten gasoline in all areas and to prevent further softness in light and heavy-fuel markets in most areas.

Surplus gasoline is still hard to find on the Group 3 market, either in the pipe line or for northern shipment in tank cars. Most of the refining capacity in District 2 is back on stream, and suppliers feel that all normal demands for gasoline during the summer months can be met. Any local shortages will be due to lack of transportation.

The strike did little to boost the movement of distillate fuels, but reduced refinery operations prevented the large addition to distillate stocks that would have resulted from normal crude runs. The loss of distillate production during the strike may have prevented some distress selling in the early summer months.

If refiners are to meet next winter's demands for home-heating fuels with enough surplus for a reasonable margin of safety, sales to secondary suppliers and consumers for storage should be started in June. A few reports of inquiries about contracts for next season indicate that at least some distributors are starting to line up sources of supply earlier than in the past.

Residual fuel is freely available in all market areas east of California, but spot trading is reported to be light. Prices generally are at the low of the market except in the Group 3 area where prices to resellers range from $1.15 to $1.20 a barrel.

The possibility of higher prices under revised ceilings has held movement of light fuels on the East Coast to sales to regular customers despite bids of 0.5 cent over the generally quoted low.

Spot tanker rates are still down to about 15 per cent over the Maritime Commission base, due in part to the reduction in shipping during the strike period.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Okla-homa, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93			
19-19.9	1.98			
20-20.9	2.03	$2.25		$2.12
21-21.9	2.07	2.27		2.14
22-22.9	2.12	2.29		2.16
23-23.9	2.18	2.31		2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel. Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

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EQUIPMENT MEN . . . in the News

Jones is Named Gulf Coast Area Manager For Oilwell

M. F. JONES

The promotion of Melvin F. Jones to manager of the Gulf Coast area of U. S. Steel's Oil Well Supply division was recently announced by K. B. Winstead, the division's general manager of sales. The area comprises all of "Oilwell's" field stores and warehouse operations in Southwest Texas, southern Louisiana, and Mississippi.

Jones has served as manager of the division's sales staff at Dallas since June 1948. He succeeds F. D. Smith, manager of the Gulf Coast area for the past 4 years, who has been transferred to Dallas as assistant to the general manager of sales. Jones is a veteran of 23 years with "Oilwell."

Pacific Coast Borax Co. Names Personnel Changes

Pacific Coast Borax Co., division of Borax Consolidated, Ltd., has announced personnel changes in its Weed Control Division. W. L. Klatt is now the Denver district manager of the division. This is the first district sales office to be established by the division. Klatt has been associated with Pacific Coast Borax since 1947, the last 2½ years as assistant manager of the Weed Control Division. J. R. Parke has been made Weed Control Division's Philadelphia representative. He was formerly associated with the company's Package Division.

Hintz Is Appointed Sales Manager For Grant Oil Tool

Appointment of Harold A. Hintz as sales manager of Grant Oil Tool Co., succeeding J. A. (Jerry) Engstrand, has recently been announced by company headquarters in Los Angeles.

Hintz studied engineering at University of Chicago, and his sales and service work includes 7 years with Axelson Manufacturing Co. as technical sales engineer in Oklahoma, Texas, and Louisiana. Following this he opened and organized West Coast offices for H. K. Porter, Inc., in San Francisco, Seattle, and Salt Lake City. For some time thereafter he functioned professionally as a consulting engineer, designing and supervising the building and tooling of plants for processing and mineralizing rubber. He joined Grant Oil Tool in March of this year.

Sawyer-Jensen Co. Names W. H. Luttgen Chief Engineer

W. H. LUTTGEN

Sawyer - Jensen Co. has announced the appointment of William H. (Bill) Luttgen as chief engineer.

Luttgen received his B. S. degree in mechanical engineering from Kansas State College in 1944. His experience includes 4 years with Lee C. Moore Corp. in charge of engineering, and 2 years in sales engineering work.

In his new position Luttgen will concentrate on extended development and field research on the company's new line of mixing equipment.

W. A. Schlueter Honored At N.G.A.A. Meeting

At the Natural Gasoline Association of America meeting in Houston recently, W. A. Schlueter, president of Refinery Supply Co., of Tulsa, and vice president of Central Scientific Co., Chicago, was presented with a medal for helpful instrument service in the natural-gasoline industry.

Schlueter's contribution to the standardization of testing methods in the petroleum industry dates back over 40 years when he helped develop the Saybolt chronometer, Saybolt viscosimeter, Tagliabue open cup flash and fire tester. Since that time he has patented many valuable items including the R. S. specific gravity gas balance, the AC-ME recording gravitometer, R. S. mercury purfier, R. S. dead weight tester, R. S. high-pressure consistometer, R. S. pressure hydrometer jar, and R. S. thermo plumb-bob thermometers.

Baash-Ross Executives Meet In Los Angeles

Top executives of Baash-Ross Tool Co., usually visiting the firm's 17 manufacturing plants and regional shop and service headquarters throughout the oil centers of the United States, gathered for this group picture on a recent occasion when all were at the home office together for the first time in a number of years. In the front row are: H. C. Ross, vice president; L. F. Baash, president; F. L. Tooley, executive vice president and general manager; and A. F. Brown, vice president. Standing are: Glenn D. Johnson, vice president in charge of research and development; John L. Dickmann, chief engineer; E. M. Gearke, general sales manager; T. A. Boyd, secretary-treasurer; Wm. J. Williams, works manager; H. Wotkyns, vice president in charge of Mid-Continent operations, and L. J. Laird, assistant general sales manager.

Otis Division Superintendents Attend Conference

Officials of Otis Pressure Control, Inc., who gathered in Dallas recently for a 3-day semi-annual conference on operating methods and new tool and equipment developments, were, left to right: Don Taylor, Dallas, manager of Otis' special service department; E. A. Kelley, Odessa, West Texas-New Mexico division manager; Bill Hill, New Iberia, South Louisiana-Mississippi division manager; J. D. Tolle, Corpus Christi, division manager; Carl M. Schwab, Dallas, general service manager; Bob L. Crain, Longview, East Texas-Northern Louisiana division manager; Harry Wyckoff, Oklahoma City, Oklahoma-Kansas division manager; Jack Rodgers, Houston, division manager, and D. E. Daffin, Houston, Gulf Coast area manager.

R. A. Scott Joins Totco As Service Representative

R. A. SCOTT

H. H. (Pete) Peters, vice president of Technical Oil Tool Corp., has reported the addition of R. A. (Bob) Scott as a Totco service representative in the West Texas area. Scott, who has had previous experience in drilling and production, will be stationed at Odessa, Tex., where he will work under the direction of Ed Siever, Totco West Texas division manager.

Franklin Supply Holds Annual Shareholders Meeting

Annual shareholders' meeting of Franklin Supply Co. was held recently at its general office in Chicago. The following directors and officers were reelected: Jene Harper, president, Chicago; Roy Wood, vice president, Chicago; Donald Ernest, vice president, Chicago; Lawrence Harper, vice president, Tulsa; Leland Strouse, vice president, Odessa, Tex.; Albert Mitchell, treasurer, Chicago; Jean Harper, secretary, Chicago, and William Quan, comptroller, Chicago.

Shareholders approved the directors' decision for the establishment of a new warehouse at Casper, Wyo. Dan Nye, formerly at Oklahoma City, has been transferred as store manager at Casper. Robert Brewster has been appointed district manager at Oklahoma City.

Jene Harper, president, advised the shareholders that Franklin Pipe & Supply, Ltd., had been formed and authorized to do business in Canada. Company headquarters will be located at Edmonton, Alta.

Cummins Engine Co. Elects Three New Directors

L. W. BECK

Three additional members were recently elected to the board of directors of Cummins Engine Co., Inc., at the annual meeting of the shareholders, held at Columbus, Ind. They are: L. W. Beck, vice president of sales; D. J. Cummins, vice president of engineering, and W. M. Harrison, vice president and treasurer, all of Cummins Engine Co., Inc.

D. J. CUMMINS

W. M. HARRISON

Beck joined the company in 1939 as manager of Cummins Diesel Sales Corp. of Illinois, the Chicago dealership. In 1940 he was named regional manager of Cummins central region, with headquarters at Chicago. He held this post until 1946, when he became general sales manager for the company. In April 1948 he was named vice president of sales.

Cummins has been with the company since its formation in 1919. He served in various capacities until 1943 when he was made manager of the research laboratory. In 1946 he became manager of quality control, and in 1947 he held the position of manager of engineering and quality control. In April 1948 he was promoted to vice president of engineering.

Harrison joined the Cummins organization in 1943 as assistant to sales manager; he became materials manager in 1944; he was named materials manager and assistant controller in 1947, and in the same year he was appointed treasurer and controller. He was named vice president and treasurer in 1948.

McIntosh Joins Dresser As Corrosion Representative

R. W. McINTOSH

Announcement has been made by H. Z. Hight, sales manager of Dresser Manufacturing Division, of the appointment of Russell W. McIntosh as corrosion products representative for the Western and Pacific Coast district.

McIntosh has had wide experience in the corrosion field, having been with Koppers Co. for 2½ years in the tar products division. He also was with the Pittsburgh Coke & Chemical Co. as West Coast manager of the protective division.

Working from Dresser industries offices at San Francisco and Houston, McIntosh will make his headquarters in Los Angeles.

Indian Drilling Mud Co. Announces Persomnel Changes

Indian Drilling Mud Co., Inc., Oklahoma City, has announced the appointment of Bethel L. (Red) Strawn as chief engineer of the company with headquarters in Oklahoma City. Strawn was formerly division engineer for Indian Drilling Mud at Farmington, N. M., where he has been succeeded by Keith Peverley. Peverley's work as district engineer at Hobbs, N. M., has been taken over by Jack Amos who was Peverley's assistant at Hobbs.

The company has also announced the recent establishment of two new warehouse points at Eldorado and Miami, Tex. W. F. (Swede) Johnson is

district engineer at Eldorado, and Gib Halsey, flying mud engineer, is district engineer at Miami.

Lovett to Manage Odessa Store for National Supply

J. G. LOVETT, JR.

J. G. Lovett, Jr., has been named manager of The National Supply Co. store at Odessa, Tex., according to Allen F. White, division manager of the company's Southwest division.

Lovett succeeds Cecil P. Triplett, who recently was named assistant district manager at Odessa.

A National Supply employe since 1943, Lovett was manager of the company stores at Imperial, Sundown, Fullerton, McCamey, and Kilgore, Tex., before being assigned to Odessa.

As manager of the Odessa store, Lovett will supervise one of National's key oil-field outlets.

Tube-Kote Names Adams West Texas Zone Manager

W. D. ADAMS

Appointment of W. D. Adams as West Texas zone manager for Tube-Kote, Inc., Houston, has been announced by L. E. Heinen, president of the company. Adams is a graduate petroleum engineer of Texas A. & M. with prior oil-field experience. Tube-Kote is one of the nation's foremost applicators and formulators of baked-on plastic coatings for tubular goods for the oil industry.

Royston Products To Be Warehoused in Tulsa

In order to expedite deliveries of its industrial coating products to western and midwestern customers, Royston Laboratories, Inc., Blawnox, Pa., has acquired additional warehouse facilities in Tulsa. Warehousing will be continued at Blawnox and Springdale, Pa.

Included among the products to be warehoused in Tulsa are Roskote cold-applied pipe mastic, Royston Glas-Wrap, Roskote quick-drying shop coats, and Roylac aluminum.

Cameron Iron Works Sales Meeting Held in Houston

Cameron Iron Works, Inc., salesmen in attendance at a 2-day sales meeting in Houston were, front row: M. L. Hooks, Casper, Wyo.; Paul Edkin, Tulsa; I. M. Baker, A. D. Cathey, and J. W. Harris, Houston; J. B. Ray, Fort Worth; J. R. Jerabeck, Houston; T. Putnam, New York; W. L. Reynolds, Chickasha, Okla.; H. E. Brown, and J. A. Tennant, Houston. Back row: W. H. Phillips, Carthage, Tex.; Ralph Neuhaus, G. Teer, and H. Helms, Houston; W. R. Davis, Midland, Tex.; D. V. Clemons, Harvey, La.; J. H. Page, Long Beach, Calif.; R. F. Farmer, and O. L. Lorehn, Houston, and F. H. Isaacks, Corpus Christi, Tex.

Otis Names L. M. Wilhoit Head of Manufacturing

Lowell M. Wilhoit has been appointed production manager for Otis Engineering Corp., manufacturing affiliate of Otis Pressure Control, Inc.

Wilhoit was general sales manager for the pressure-control company prior to his assignment to the engineering post. He has been with Otis for more than 17 years and was superintendent of Otis divisions at Oklahoma City, Hobbs, N. M., Houston, and New Iberia, La., before being sent to the company's home office in Dallas as chief engineer several years ago.

Wilhoit is a graduate of Oklahoma A. & M. with a degree in mechanical engineering.

Newman Is Named Head of Labline, Inc.

Laboratory Industries, Inc., Chicago, and Alexander I. Newman, formerly executive vice president of Precision Scientific Co., have announced the formation of Labline, Inc., for the manufacture of laboratory apparatus, instruments, and equipment.

In his capacity as president of the new corporation, Newman, in addition to his administrative duties, will devote special attention to new laboratory instrumentation. Arrangements are being completed for enlarged manufacturing, research, and development facilities.

The company's expanding line of products sold under the names "Alumaloy" and "Labline" include laboratory clamps, apparatus, baths, ovens, and laboratory furniture.

A. O. Smith Names Cain To Sales Post at New Orleans

Will Cain has been appointed New Orleans sales representative for A. O. Smith Corp., steel fabricators and process equipment manufacturers. He will handle process equipment, line pipe casing, industrial grating, and vertical turbine pumps in the rapidly expanding southern Louisiana petroleum and chemical industries.

In 1927 A. O. Smith introduced welded large-diameter steel pipe which was a factor in making it economically practical to lay the network of transcontinental pipe lines which now move 10 per cent of the nation's freight tonnage.

Iverson Supply Co. Holds Annual Shareholders Meeting

Annual shareholders meeting of Iverson Supply Co. was held recently in the company's Tulsa offices. The following officers and directors were re-elected: S. J. Iverson, president; A. M. Iverson, vice president; T. D. Collins, vice president and general manager, and H. B. Downing, secretary and treasurer.

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FOR SALE: Bethlehem Breeze Rig complete with twin GM Diesels; 96 foot Lee C. Moore mast; about 3500 ft. 4½" Drill Pipe; 7¼ x 14 Pump, measuring line, slips, subs, barrels, etc., complete ready to drill. Box 176, Salem, Illinois.

FOR SALE: 20 pressure tanks 8' diameter X 16' high ⅜'s welded and riveted construction—with mounted feet on sides. Top and bottom equipped with gasket pressure-type heads. 20 units available each $450.00 f.o.b. western Pennsylvania. Box E-737, The Oil and Gas Journal, Tulsa, Oklahoma.

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3,500' 5½ O.D. 14# No. 1 Used Seamless Casing 8RD. R2.

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7—CLARK GAS ENGINE GAS COMPRESSORS

1—230 H.P.—17x18x26x20
1—230 H.P.—17x18x24x20
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FOR SALE: 10¾", 32#, 8⅝" 24#, and 7" 20# good casing located in Central Pennsylvania. Write Box E-775, The Oil and Gas Journal, Tulsa, Oklahoma.

WILSON Giant draw works powered with 2 model 12103-HD GMC Twin Diesel Engines. Can be inspected while running. Phone 3-2806, Wichita, Kansas, or P. O. Box 497, Tulsa, Oklahoma.

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WE sell used/rebuilt Well Drilling Equipment, Bulldozers, Draglines, electric generating plants, air compressors, trenchers, railroad equipment, surplus machinery, etc. Mr. Gonzalez, Baker Export Co., Pecos, Texas.

NEED a good 4500 foot draw works? Wilson Giant, Vacuum controlled, GM 12103 Twin Six Diesel, Pump drive, Friction catheads. Excellent running condition. Located Great Bend, Kansas. C. Spitzfaden, Box 2001, Wichita, Kansas. L. D. 128.

ONE—45-C Star spudder with 10" A Pole. 1—13 thousand diesel motor. 1—Koehler light plant. 15" down to 5" tools. Winter house, floor walks. Drilling lines, sand lines. All tools for running rig. 12", 10" and 8" casing, all seamless pipe. These tools are running in good shape. Bad Health. Archie Newland, Yates Center, Kansas. Phone 232.

FOR SALE: Two 28-L Bucyrus Spudders, tools 15½" down to 3½" with complete combination rotary to run off of either rig. One tandem truck, one light truck, 10¾ and 8⅝" casing. Further details, write or call L. & L. Drilling Company, Phone 69, Box 67, Cross Plains, Texas.

FOR SALE: 136' Muskogee 800,000# API Capacity Steel Derrick, 9' 1,000,000# Sub-Structure with lumber and timbers. Good shape, drilled only 7 wells, dismantled. $7,500.00 FOB location. Grady Forbes, 6-3552, Box 2649, Odessa, Tex.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

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Good as new, for immediate delivery. One 80,000 BBL. Seven Ring all steel tank for $25,000.00. Three 55,000 BBL. Five Ring all steel tanks for $17,500.00 each. As is where is and subject to prior sale. We will also cut down and re-erect as welded tanks either of the 55,000 BBL. tanks above for $38,500.00. Or we will cut down and re-erect the 80,000 BBL. as a welded tank for $50,250.00. These are rivited tanks and of standard construction and may be inspected now near Shreveport, La. Contact by mail or phone

We will trade any of the above tanks for Scrap iron.

CLYDE DAMPF, INC.
Box 2515, Amarillo, Texas. Phone 3-3680

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5—80,000 bbl. tanks riveted, shell and bottom only, cut down or standing, located at Norris City, Illinois.
1—80,000 bbl. tank, riveted, steel roof, cut down or standing, located at Udall, Kansas.
Priced to sell.

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EQUIPMENT FOR SALE

1, S-32 ($17,500.00), or 1, S-32 Special ($32,500.00) Walker-Neer Spudder. Each unit new, trailer mounted, and complete with tools. Fine, heavy equipment. Inventory available. Emanon Drilling Co., Inc., Abilene, Tex.

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FOR SALE: Two truck-mounted Bettis steam generators; one 30 hp. on a '48 Ford C.O.E.; one 40 hp. on a '41 Chevrolet 4 by 4. Both units completely equipped. Also selling yard and building at Russell, Kansas. Going out of business. Dave Edmiston, Russell, Kans.

FOR SALE: 25 Gamma Magnet-o-meter, German Build. P.O. Box 1016, Wichita Falls, Texas.

FOR SALE: One Ready-Power Engine Generator, complete with control cabinet with automatic or manual regulator switch. Specifications are KVA 28.75, KW 23, Volt 120-208, Amp. 64, Phase 3, Wire 4, RPM 1200, Cycle 60, will run on either gasoline or on natural gas, 60 Horse Power International U-9 Engine. This has been used as a standby source of electric power but it is in good condition. It may be inspected at our plant located eight miles South of Ulysses, Kansas, on Highway 270. Price, $1,500. Address inquiries to Hugoton Production Company, Garden City, Kansas.

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No Priority Required
4 x 6—4,000# Plunger Load.
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ENGINE-POWER UNIT—"Caterpillar" D13000Y, open type clutch, equipped with outboard bearing, pillow blocks, safety shut-off group, 15½" X 16" fibre pulley. Good running condition. Makes excellent appearance. F.O.B. Louisville $3850.00

ENGINE-POWER UNIT—International Diesel UD18A, open type clutch, equipped with outboard bearing, pillow blocks. Recently cleaned and painted. Ready to go to work. F.O.B. Louisville $2975.00

MOTOR GRADER — Adams Diesel Model 312, equipped with 9-tooth, V-type scarifier, cab with door, starter, battery, generator and lights. Rubber above average consisting of four 12.00 X 24 8-ply rear tires and two 9.00 X 24 10-ply front tires. Good operating condition. F.O.B. Louisville $5250.00

TRACTOR-DOZER—"Caterpillar" Diesel D8, equipped with crankcase guard, front pull hook, LeTourneau angledozer and LeTourneau double drum cable control unit. A lot of real work left in this machine. F.O.B. Louisville $8850.00

TRACTOR-DOZER—"Caterpillar" Diesel D7, equipped with radiator guard, crankcase guard, front pull hook, 20" heat treated grouser track assembly, further equipped with LeTourneau cable controlled angle blade and LeTourneau single drum rear cable control unit. A real bargain. F.O.B. Louisville $4350.00

ROY C.
WHAYNE
SUPPLY CO.
800 W. MAIN ST., LOUISVILLE, KY.

EQUIPMENT FOR SALE

FOR SALE: One #43 Star Spudder complete with tools four miles east of Delaware, Okla. Call 3-0390, Tulsa, or 54-1488 after five. C. L. Sutton, 1001 First National Bank, Tulsa, Okla.

FOR SALE: Good 3½" and 4½" OD Drill pipe. Two EKU Waukesha's, One RL Cardwell, Hercules Engine, Tanks, Treaters, Pumping units. Rogers Pipe & Supply Co., 620 Wright Bldg., Tulsa, Oklahoma.

FOR SALE: Wilson Super Winch, Waukesha power, 8" x 7" pole, mounted on Ford truck, complete set rod and tubing tools. Cleaveland Well Service, P.O. Box 308, Tel. 446, Luling, Texas.

USED Sullivan Model 22 Heavy Duty rig mounted on 1947 Ford truck. Twenty-four foot mast. One hundred feet of "N" standard drill pipe furnished. Original cost of drill $12,500. Selling price $6,500. Drill in good condition, ready to use. Contact Geo. E. Failing Supply Company, Enid, Okla.

FOR SALE: International LF212 RD450 Tandem winched rollered flat bed truck with tandem pole trailer; TD18 International Cat with winch and blade. Box 176, Salem, Illinois.

FOR SALE: At Oklahoma City, 3—2" used Dean-Hill high pressure 4 stage Centrifugal pumps, 60 GPM-3450 RPM, 300' Head, 3" Suction, 2" Discharge, mounted on Cast Iron base and driven by 30 HP 3 phase 60 Cycle, 440 Volt, Type FX, Frame 265S, Form A, Louis-Allis motors. Cities Service Oil Company, Patridge, Bartlesville.

FOR SALE: Unit Rig U-34 draw works with 2—145 GKU Waukesha engines and 2—10,000 series Twin Disc Torque converters; 1—7¼" X 14" Gardner Denver Pump powered with a V-12 LeRoi; 96' Lee C. Moore mast with 7' substructure. This rig is complete with drill pipe and drill collars, ready to drill, located at Hobbs, N. M. Sharp Drilling Company, Box 1271, Midland, Texas.

FOR SALE: 15000' Rig. Bethlehem MC-950 draw works; 3 engine chain compound with double pump drive; 3 LRO Waukesha engines; 1—7¾" X 18" G600 Bethlehem Pump; 1—7¼" X 16" G300 Bethlehem Pump; Lee C. Moore 136' Cantilever mast with 14' substructure; 2—12" QRC Cameron Blowout Preventors. This rig is complete with drill pipe and drill collars, ready to drill, located in Lea County, N. M. Sharp Drilling Company, Box 1271, Midland, Texas.

FOR SALE: 15000' Rig. Bethlehem MC950 draw works; 3 engine chain compound with double pump drive; 3 LRO Waukesha engines; 1—7¾" X 18" G600 Bethlehem pump; 1—7¼" X 16" G300 Bethlehem Pump; Emsco 136', 800,000# capacity derrick; 9' engine sub-base; 2—10¾" QRC Cameron 6000# test blowout preventors. This rig is complete with drill pipe and drill collars, ready to drill, located in West Texas. Sharp Drilling Company, Box 1271, Midland, Texas.

ELI Rotary Drilling Rig on 1950 K13.7 International truck. 1600 ft. new heavy duty 2⅞ drill pipe. New D. & S. 20 ft. core barrel. Dog house and all necessary equipment. C. C. Pearson, Phone 176, Nokomis, Ill.

WELL drilling equipment, new or used. Spudders, rotaries, core & shot hole drills, tools, pipe, bits, blocks, pump jacks, valves. Everything for well drilling and service. Fishing tools rented. Pressey & Son, Pueblo, Colo.

EQUIPMENT WANTED

WANTED TO PURCHASE

Used sucker rods ⅞" and 1" diameter to be used for structural purposes.

Write—Wire—Phone

Sonken-Galamba Corp.
2nd and Riverview (X-853)
Kansas City 16, Kansas
THatcher 5141

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WE BUY well drilling equipment machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

WANTED: Jackknife Derrick and Substructure. Prefer L. C. Moore 87' or 94'. Will consider any good Jackknife. Contact Box 1022, Del Rio, Texas.

LOSS CORPORATION

Want drilling or oil producting corporation showing operating loss over $25,000; will pay cash. Airmail or wire details to

NORMAN D. FITZGERALD
1141 Butternut Street, Abilene, Texas

BUSINESS OPPORTUNITIES

COMPANY with new warehouse and office facilities in Odessa and well established with Permian Basin Drilling and Production Accounts desires to represent manufacturer of production or drilling specialities. A more complete description of company's facilities and sales potential can be obtained by writing Box 2466, Odessa, Texas.

MANUFACTURERS! A well established company with office and warehouse in Odessa, Texas, maintaining an experienced sales force in close contact with drilling, production, and supply companies of the entire Permian Basin, desires to represent manufacturer of highest quality oil field specialties. Address Box E-787, The Oil and Gas Journal, Tulsa, Okla.

MANUFACTURER of well established line of drilling equipment desires representation in Oklahoma, Kansas, Illinois, and Rocky Mountain areas through Manufacturers Agent. Send full particulars. P. O. Box 1436, Houston, Tex.

MANUFACTURING FACILITIES

WANTED

Manufacturing Contracts for Heavy Machine Work, Metalizing, Fabricating and Code Welding Steel or Alloys. Engineering and Design Assistance. Good Loading Facilities and Storage Space. Located in Tulsa Area.

Box E-709, The Oil and Gas Journal, Tulsa, Oklahoma

HELP WANTED

RAPIDLY expanding Company wants College graduate for Oil Country sales job. Must be between 27 & 35 years of age. Write stating qualifications and present position. All replies confidential. Box E-735, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Experienced Reservoir Engineer by independent company. Individual must know well workover procedure and be capable of making recommendations toward maintaining an optimum reservoir cycling program already in progress Box E-750, The Oil and Gas Journal, Tulsa, Oklahoma.

SMALL progressive engineering company requires petroleum engineer qualified for registration to supervise core analysis laboratory and engage in reservoir engineering. Permanent and good future for right man. Box E-739, The Oil and Gas Journal, Tulsa, Oklahoma.

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-616, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Chemical Engineers and Chemists for positions in Refinery Research and Development department, located in Tulsa. State qualifications and salary expected. Write Personnel Department, P.O. Box 381, Tulsa, Oklahoma.

SEISMIC PERSONNEL: Party chief, surveyors, observer and shooters for oil company establishing its own geophysical department. Excellent opportunity for right men. Box E-795, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

WANTED: Combination Safety Engineer and Metal Inspector. Southwest Refinery. Box E-681, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: A drilling and production superintendent for gas company owning approximately 50 wells in north and south Louisiana. The man should be capable of handling workovers, drilling and general production problems of the gas wells. Prefer man in early thirties. He would locate at present in north Louisiana. Box E-781, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

Manufacturer Sales Agent. Plastic pipe manufacturer. Pipe used in oil and agricultural industries. Set-up distributors; liberal commission. Contact

Box E-764
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

PURCHASING AGENT

Major petroleum refinery and chemical plant construction company located in New York has excellent opportunity for outstanding Purchasing Agent with minimum 10 years' experience in refinery type of job purchasing. Please submit complete resume including past earnings record. Your reply is confidential.

Box E-776, The Oil and Gas Journal
Tulsa, Oklahoma

Chemical Plants Division
Blaw-Knox Construction Co.

Needs

Process Engineers
Piping Design Engineers
Mechanical specification Engineers
Planning and scheduling Engineers
For Tulsa Office

Electrical Engineers
For Tulsa and Pittsburgh, Pennsylvania Offices

Construction Field Accountants
For Assignment From Tulsa Office

Must Be Experienced in Refinery, Gasoline, Industrial and Chemical Plant Work

P. O. Box 1266 **Tulsa, Okla.**

HELP WANTED

GEOPHYSICIST: Moderately sized company with active exploration program desires geophysicist. This company presently conducting geophysical program with contract geophysicist but is planning on Geophysical Department. Only applicants under 35 years and with sufficient training and experience to act as supervisors considered. Prefer men with major company experience. Permanent location at company headquarters. Write giving experience and training in detail, and salary desired. Box E-786, The Oil and Gas Journal, Tulsa, Oklahoma.

RESERVOIR ENGINEER with over 5 years' experience, including field training. Independent California operator. Box E-748, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 405 Tuloma Building, Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technically trained personnel. No fees. Confidential.

WANTED — SEISMOGRAPH PARTY CHIEF. Must be fully qualified. Age 27-36. A good opportunity for the right man. Box E-770, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED!
MANUFACTURERS'
REPRESENTATIVES
Plastic Piping

Exceptional money-making opportunity to handle a complete line of Extruded Plastic Piping manufactured by a well-established, experienced Chicago plastics company. Generous commission arrangement. Protected territories. A "natural" for a man with a following in the oil and gas fields. Plastic Piping has stimulated terrific interest and sharply rising volume of sales in both industries because of its noncorrosive, light-weight, easy-to-install advantages. Write full details in first letter.

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PETROLEUM ENGINEER
For Chemical Development

We're expanding at the Armour Chemical Division and need a petroleum or chemical engineer with experience in crude oil production and recovery.

This is more than "just a job"—it's a real opportunity for a man experienced in technical service and field development work to grow with the rapidly expanding chemical division of one of America's foremost companies . . . good pay, job security—with liberal pension and hospitalization plans.

Write giving background and personal history and salary expected to Manager of Market Development.

ARMOUR CHEMICAL DIVISION
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Chicago 9, Illinois

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for
LARGE INTERNATIONAL OIL COMPANY

Entertaining applications of graduate chemical, mechanical, structural and electrical engineers for refinery engineering assignments at home and abroad.

Engineers with refinery experience and also recent graduates will be considered.

Box E-667, The Oil and Gas Journal, Tulsa, Oklahoma

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628. Ph. No. 3-3141, Hobbs, New Mexico.

PETROLEUM Production Engineer with 15 yrs. experience in drilling, completion, work-over, production work and supervision of production and engineering departments. Presently employed, desires change to a progressive company with future. Reply Box E-758, The Oil and Gas Journal, Tulsa, Okla.

GRADUATE petroleum engineer, 29, married, three years intensive experience includes drilling, completing, producing, and reworking oil and gas distillate wells, and collecting and keeping engineering data and records, desires position with good possibilities for advancement. Independent or company. Box E-763, The Oil and Gas Journal, Tulsa, Okla.

PRODUCTION SUPERINTENDENT. Graduate Petroleum Engineer. 12 years responsible experience producing industry. Geological ability. Mid-Continent or Rocky Mountains. Box E-774, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST—Geologist — Geochemist, Consulting—Land and leasework. Twenty years experience in field operation and data interpretation. Desires full or part time employment in Illinois Basin. Now resident of Mattoon, Illinois. C. G. Rosaire, Box 352, Mattoon, Illinois.

GRADUATE Lawyer with 15 years' experience in land and title work, legal investigations, oil and gas lease buying, deal and contract analysis in Mid-Continent area, desires change in order to procure position with right to make royalty play for himself. For references and further information write Box E-782, The Oil and Gas Journal, Tulsa, Oklahoma.

SENIOR Process Engineer desires responsible position as operating supervisor, process engineer, or executive's technical assistant in refining, natural gasoline, or petrochemical industry. Twelve years refining experience includes catalytic, thermal cracking; catalytic, thermal reforming; coking; alkylation; polymerization; gas recovery; stabilization. Ambitious. Age 34, married, two children. Foreign locations considered. Box E-796, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED petroleum geologist wants independent oil company connection. Los Angeles headquarters. Box E-790, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING SUPT., now employed, desires change. 20 years experience Rocky Mountain area. Also experienced in drilling and developing large type irrigation wells. Good references. Box E-791, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT-OFFICE MANAGER. Presently employed Major Oil Company. Experienced Field Operation, General and Cost Accounting, Drilling Operations. Past experience electrical mfg., insurance, banking. Degree business administration. Desire connection with independent operator, contractor or small company offering increased responsibilities, opportunity for promotion, possible share in business. Box E-788, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN EMPLOYMENT — BS Chemical Engineering. Five years domestic and foreign experience in chemical and mechanical engineering. Presently supervising refinery group engaged in equipment inspection and corrosion control. Box E-789, The Oil and Gas Journal, Tulsa, Oklahoma.

CORROSION ENGINEER Graduate. 5½ years pipe line experience. Cathodic protection bare & coated lines plus coating inspection. Desires change involving minimum of traveling. Box E-794, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Petroleum Engineer with eleven years field experience and equipment design. Box E-793, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

WILLISTON BASIN ROYALTIES
Dealers in Montana royalties since 1921, we now specialize in royalties under major company leases in the Montana portion of the Williston Basin. For information on our method of operation, write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

LEASE AND DRILLING BLOCKS

FOR SALE by Land Owner: 5 year oil & gas lease, Colorado County, Texas. Columbus Tap Survey, Abstract 153. Near production gas-distillate. $20.00 Bonus, $5.00 Rental, 1/32 OR. P.O. Box 5117 West Austin Station, Austin, Texas.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2183, Denver Colorado.

WILL consider selling interest large block oil leases Montana. Also consider drilling commitment. Box E-783, The Oil and Gas Journal, Tulsa, Oklahoma.

POTENTIAL OILFIELDS
ROOSEVELT CO., N. M., Sec. 36-2S-30E. Well ready drill testing Permian oil sands within ½ mile indicated flowing well. Royalty under Major Co. lease 1 mile of well. DEBACCA CO., N. M., Sec. 33-3S-29E. Royalty in Major Co. block near proposed deep test. Data on request.
W. J. PETERMAN, GEOLOGIST
Portales, New Mexico

PRODUCTION WANTED

Principals interested in purchasing operating producing properties in Mid-Continent Area.

P. O. Box 556
Kansas City, Missouri

LEASES ROYALTIES

Producing and Nonproducing
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Inquiries Invited

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6635 Delmar Ave., St. Louis 5, Mo.

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Oil Properties
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Phone 40-218 Minot, North Dakota

GET IN ON A "MAJOR" PLAY!

Major Oil Companies and a large number of progressive independents are making a great lease play in certain areas of Western Kansas, and we have some well located leases and royalties right in with and under the big company spreads. Here is the small man's chance to be in on the ground floor of a 'big company' play. Write us for full details.

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P. O. Box 881
Tulsa, Oklahoma

LEASE AND DRILLING BLOCKS

FOR LEASE on ⅛ basis 100,000 acres by owner. Located on Cumberland plateau. (Tennessee's coal basin). Both oil and gas now being produced at shallow depths from adjoining acreage. Box E-617, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: All or any part of a well selected spread of leases located on the 1000 foot to 3000 foot contours of the Williston Basin in North Dakota, Eastern Montana, and Northwestern South Dakota. These leases were carefully selected as to location. Write for descriptive list if interested. W. J. Clay, 701 W. T. Waggoner Bldg., Fort Worth, Texas; or Service Drilling Company, Kennedy Bldg., Tulsa, Oklahoma.

FOR SALE or Farm Out on Drilling Contract. 8000 acres in Trigg County, Kentucky. Located both south and west of Big Trigg Fault. C. P. Taneyhill, P. O. Box 304, Bowling Green, Ky.

PRODUCTION for Sale: Two producing wells on 40 acre lease near Tulsa. Must sacrifice immediately. Post Office Box 26, Tulsa, Oklahoma.

IF you wish description of Govt. owned minerals, open for oil leasing, in any county, any state, in 24 hours, write C. S. Callahan, 1206 St. Paul St., Baltimore 2, Md.

LEASE: Two 1500 acre blocks Vermillion Basin, early filled Pleistocene Valley, similar to Williston Basin, near Platte Pipe Line, oil seeps, $2.00 acre. H. T. Harper, Vermillion, Kans.

WE invite inquiries from persons interested in Oil and Gas Leases in Southern Alberta, North Central Montana and the Williston Basin. Box E-664, The Oil and Gas Journal, Tulsa, Oklahoma.

RANCHES

BEST INVESTMENTS IN THE WORLD!! OLD MEXICO RANCHES!!

140,000 acre 6,000 foot high unimproved combination sheep and cattle ranch. Plenty of grass. 200,000 dollars this is a steal. Will divide in ½ if necessary. 80,000 acre gramma grass ranch with 2000 head finest registered Herefords. Best improved ranch in all of Mexico. All for ½ million dollars. 23,000 acre ranch. 1,000 acres in Guinea grass which run one head per acre. 16 miles river frontage fenced and cross fenced. 14 new houses. Everything goes at $5.00 per acre. Write us for listings on our other ranches and farms. American citizens: can buy in Mexico and retain your citizenship. Write us for our listings on other real estate properties. MEXICAN RURAL INVESTMENTS CO.—Edificio Chapa, Desp. 1306, Monterrey, N. L., Mexico. Phone 68-90 Rojo.

SERVICES

GAS MEASUREMENT

Attention Small Gas Operators: Technical advice on gas problems, meter inspections, charts computed and purchasers billed. Please write us about this service. Box 7261, Tulsa, Okla.

RANCHES and FARM LANDS

FOR SALE: 2080 acre ranch with 100% Oil, Gas, and Mineral Rights. 1000 acres under cultivation, 6 room Stucco house, 7 stock watering dams. In Perkins County, South Dakota. Price $22.50 per acre. Immediate possession. Address C. H. Mork, Lemmon, S. D.

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Trade what you have for that cattle or sheep ranch, you always wanted, in the Rocky Mt. country. We specialize in trades. Have some good ones to offer. Tell us what you want. What you have to trade. See . . . Call . . . or Write to

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Realtor
Keystone 8313
400 Denver Livestock Exchange Bldg.
Denver 16, Colorado

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FOR SALE MAPS

*** NEW WILLISTON BASIN MAPS ***

NORTH DAKOTA - MONTANA — Complete County Ownership Maps. Showing Up-To-Date Fee Lease, Well Data. Scale: 1" = 4000'. Price: Paper, $15.00; Cloth, $25.00. Also Available: Williston Basin Map—State Maps—and Area Ownership Maps.

(For Details Write to)

Austin Map Co., Fort Worth 2, Texas
509 Neil P. Anderson Bldg. FO-6878

WILLISTON BASIN MAPS

JUST COMPLETED

COVERING: North Dakota, South Dakota, East Montana, Northeast Wyoming.
SHOWING: Structures, Township and Range, County Outline, County Seats. All wells drilled or drilling. Total depths, Completion Dates, Operators' names. Size 42" x 54".

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Individual County Ownership and Lease Maps

(Twenty-three county maps in stages of completion in the Basin.)
Scale: 1 inch equals 4,000 feet
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OWNERSHIP MAPS
All of Eastern Montana in Williston Basin

These maps are up to date and show all federal, State, Fee Landowners and Northern Pacific Railway Oil & Gas rights. All Oil & Gas Lease with expiration dates indicated. All federal Oil & Gas leases and applications. All lots, rivers, county boundaries, sections, townships, roads and towns. All producing wells and dry holes.

We now have available all or parts of Daniels, Sheridan, Roosevelt, Richland, McCone, Dawson, Prairie, Wibaux, Custer, Fallon and Carter Counties in Montana. All producing areas and drilling wells in Eastern Montana now mapped.

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238 Korber Building
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Central Area

(Continued from page 157)

Montgomery County: George Cassens 1 Nieman, 330 ft. from SL and 40 ft. from WL NW NE 7-7n-5w, dry, TD 680 ft.

Wayne County: Skiles Oil Corp. 1-F J. G. Boggs estate, NW NE NW 36-2s-6e, dry, TD 3,455 ft.

White County: W. L. Griffith 1 Shoeman, NE SW NE 36-2s-6e, dry, TD 3,455 ft.

INDIANA WILDCAT FAILURES

Gibson County: J. Murphy 1 Stroble, NE SW SE 24-1s-10w, dry, TD 1,785 ft.

F. A. Bippus and R. A. Harris 1 Key, NE NE NE 21-2s-11w, dry, TD 2,322 ft.

Continental Oil Co. 1 Hoefling, SW SW NW 10-3e-10w, dry, TD 2,162 ft.

Parke County: E. J. Cunningham 1 Beatty, SW SE SW 23-14n-8w, dry, TD 1,454 ft.

Pike County: The Texas Co. 1 Barnett, SE SE NE 16-1s-7w, dry, TD 1,485 ft.

Posey County: Clark & Clark 1 Huber, NE NE NE 11-6s-12w, dry, TD 2,009 ft.

Sullivan County: Ottinger & Burgin 1 Bogard, SE SE SE 16-7n-10w, dry, TD 870 ft.

Vanderburgh County: Burr Lambert 1 Boulder, NW SW NE 5-5s-10w, dry, TD 2,355 ft.

Vigo County: R. Lowrey and C. S. Able 1 Baum, SE NE SE 36-12n-8w, dry, TD 755 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Daviess County: A. Marcell 1 Woodward, NW SE SW NW 22-O-27, dry, TD 2,238 ft.

Stanford Oil Co. 2 Yeiser, NW NW NW SE 15-N-30, dry, TD 935 ft.

Hopkins County: White & Vickery 2 Taylor, SW SE NE NE 11-I-21, dry, TD 632 ft.

Fred Heldt and Olds Oil Co. 1 Whitesell, NW SE SE 6-K-25, dry, TD 1,679 ft.

Walter Sargent et al 1 Parker, SW NW SE SE 12-L-25, dry, TD 3,041 ft.

McLean County: George S. Engle 1 Warren, NE NW SW SW 14-N-25, dry, TD 2,508 ft.

Union County: George S. Engle 1 Union Bank & Trust Co., NW NW NE NE 7-P-20, dry, TD 2,664 ft.

MICHIGAN SUCCESSFUL WILDCAT

Allegan County, Casco Township: Louis Zellman 1 Walker, NE SE SE 13-1n-16w, Traverse 1,175 ft., 3 bbls., TD 1,177 ft.

MICHIGAN WILDCAT FAILURES

Clare County, Garfield Township: Joseph W. Sturman 1 Knox, SE SE SE 35-17n-6w, Dundee 4,055 ft., dry, TD 4,201 ft.

Kent County, Caledonia Township: H. J. Hirzel 1 Fitch, NE NE NW 7-5n-10w, Traverse 1,937 ft., dry, TD 1,980 ft.

Montcalm County, Cato Township: Merrill Drilling Co. 1 Molitor, SW NE SW 6-12n-8w, Dundee 3,443 ft., dry, TD 3,548 ft.

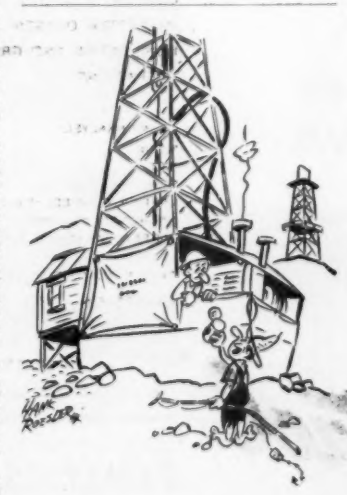
Newaygo County, Beaver Township: Klondike Petroleum Co. 1 Nelson, SW SW NW 32-15n-14w, Traverse 2,209 ft., dry, TD 2,212 ft.

Ottawa County, Zeeland Township: Orville Palmer 1 Roelofs, NW SW NE 29-5n-14w, Traverse 1,490 ft., dry, TD 1,523 ft.

Zeeland Township: P. K. Degenther 1 DeVries, NE NE SE 34-5n-14w, Traverse 1,539 ft., dry, TD 1,585 ft.

Saginaw County, Birch Run Township: Francis T. Canon 2 Rose, SE SE SE 25-10n-6e, Dundee 2,447 ft., dry, TD 2,479 ft.

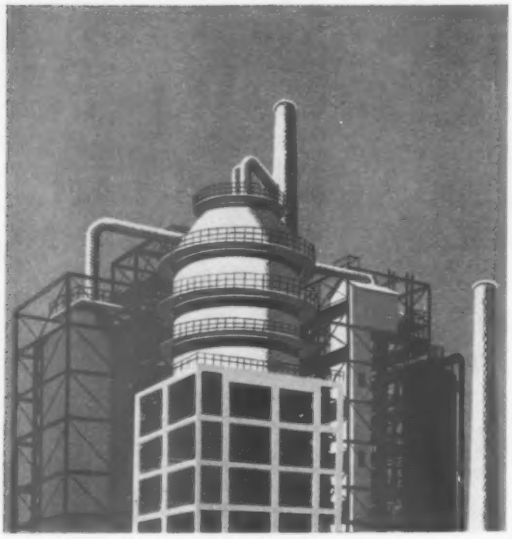
Van Buren County, Geneva Township: Norman L. Stevens 1 Frude-Lewis, SW SE SE 25-1s-16w, Traverse 1,116 ft., dry, TD 1,131 ft.



"I thought maybe you fellows hit worms occasionally."

LEGAL

Sealed bids for oil and gas mining leases on certain trust lands on the Crow Indian Reservation, Big Horn and Yellowstone Counties, State of Montana, will be received at the Office of the Superintendent, Crow Indian Agency, Crow Agency, Montana, up to 2:00 o'clock P. M., Montana Standard Time, June 6, 1952. For further information, call or write L. C. Lippert, Superintendent, Crow Indian Agency, Crow Agency, Montana.



Top Performance from Cat-Cracker Regenerators

A CAREFUL STUDY OF THE REGENERATION DATA FROM CATALYTIC CRACKING INDICATES THAT OXYGEN DISAPPEARANCE (USUALLY CALLED HYDROGEN IN COKE) INCREASES WITH INCREASING CARBON ON REGENERATED CATALYST. ABILITY TO CRACK GAS OIL, AS WELL AS GIVE GOOD GASOLINE TO CARBON RATIOS, DROPS RAPIDLY WITH INCREASING CARBON ON REGENERATED CATALYST; HENCE THE CATALYST THAT REGENERATES MOST EASILY CAN SHOW REAL ADVANTAGES. BY ITS NATURE, FILTROL'S CATALYST FLUID 58 HAS A FASTER REGENERATION RATE IN COMMERCIAL OPERATION THAN OTHER CATALYSTS IN GENERAL USE. THE BETTER REGENERATION RATE RESULTS IN BETTER OXYGEN UTILIZATION, HIGHER GASOLINE-CARBON RATIOS AND GREATER RETURN FROM CAT CRACKING OPERATIONS.

ORSAT ANALYSIS	FILTROL* CATALYST FLUID 58	OTHER CATALYSTS	
%CO_2	11.8	9.5	1.3:1
%CO	5.7	7.3	
%O_2	1.7	2.5	
CARBON BURNED, #/HR.	18,500	17,900	
HYDROGEN IN COKE	8.4	9.6	
CARBON ON REGEN. CAT.	0.3	0.6	

THE FIGURES SHOW THAT CO_2/CO RATIO IS NOT THE CRITERION OF REGENERATION CAPACITY.

OTHER
REASONS FOR USING
FILTROL CATALYSTS

1. Higher octane barrels
2. High butylene yield
3. Low cost
4. Sulphur resistant catalysts
5. Technical assistance
6. Varied plant facilities
7. Uniformity
8. Lowered excess butane
9. Low attrition rate

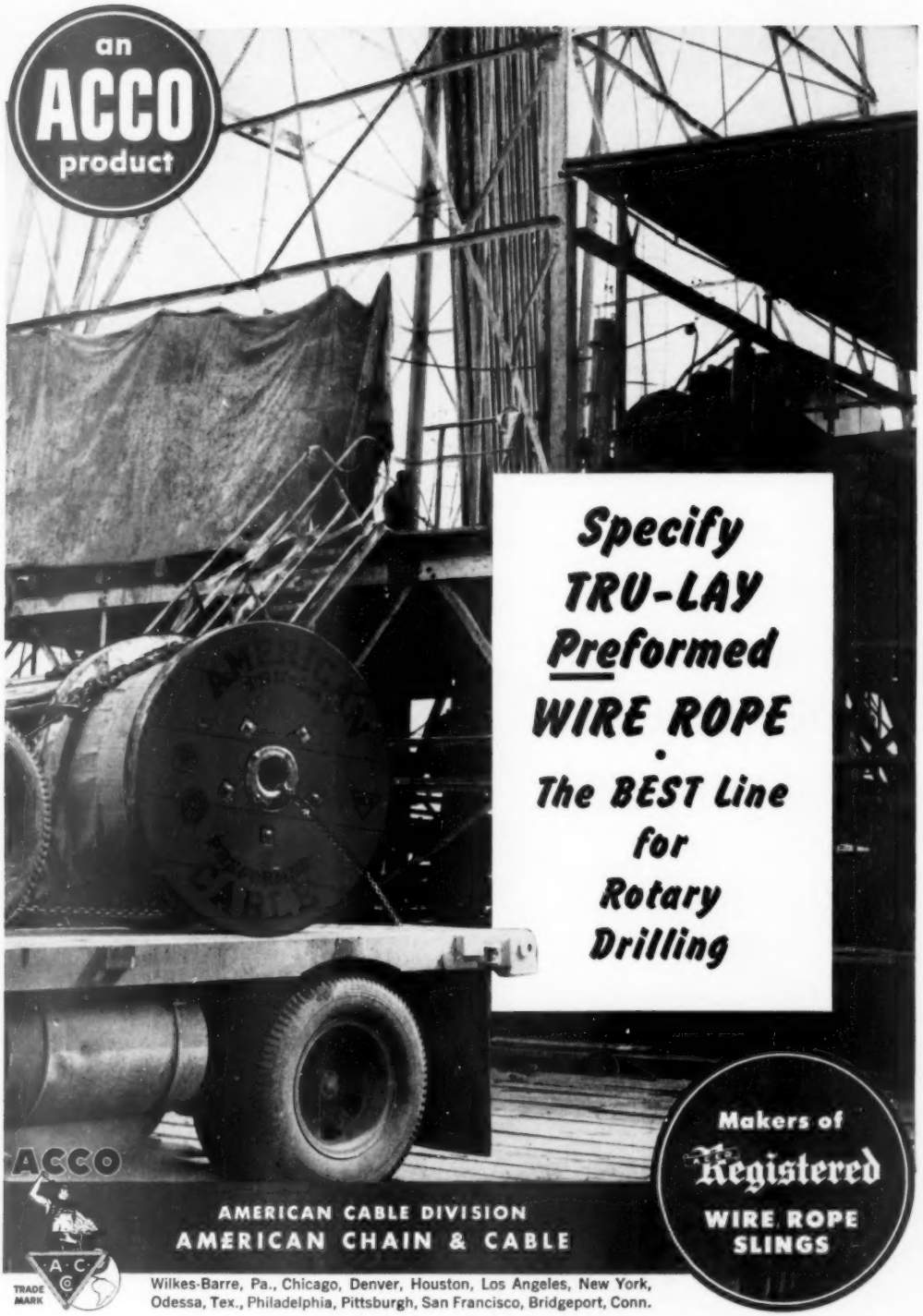
Filtrol*

FILTROL CORPORATION

OFFICES: 727 WEST SEVENTH ST., LOS ANGELES 17, CALIFORNIA
PLANTS: VERNON, CALIF.; SALT LAKE CITY, UTAH; JACKSON, MISS.

CATALYSTS AND ADSORBENTS

*T. M. REG. U. S. PAT. OFF.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Specify
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WIRE ROPE
The BEST Line
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TRADE MARK
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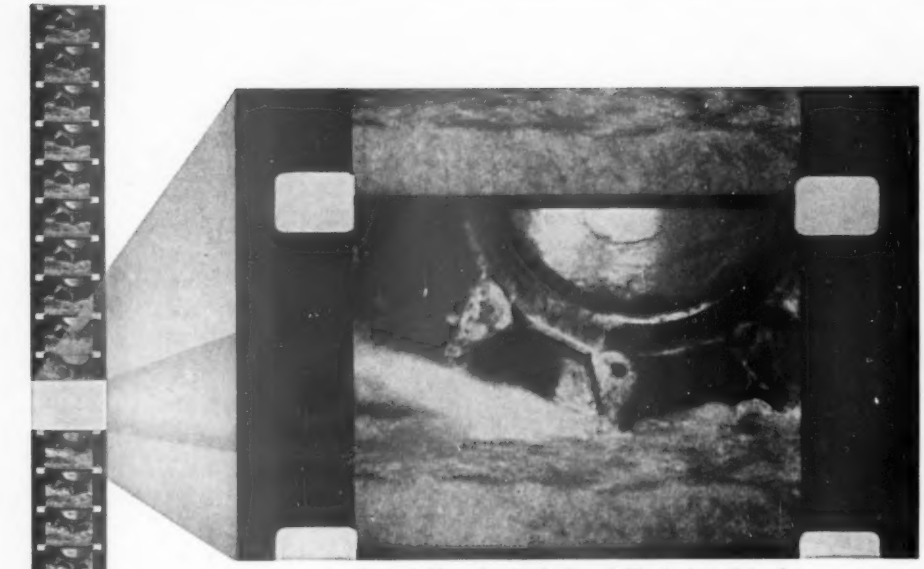
Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.



Unretouched frame from Hughes Research Film showing explosive effect as heel tooth penetrates formation.

Hughes advances tooth action research

Knowing exactly what happens when bit teeth bite into the formation is essential in perfecting bit design.

Every means that will clarify tooth action is used by Hughes engineers. This includes the study of bottom hole patterns, data obtained from millions of bits run on thousands of rigs, and motion pictures taken with super high speed camera equipment.

This is work in which small improvements are important. For instance, a design change that leads to the removal of 1/64" more formation on each revolution of the bit can increase the penetration rate approximately five feet per hour at a rotary speed of 60 to 70 RPM.

The study of tooth action is part of HUGHES' overall research program dedicated to the idea that *improvement is a continuing process* . . . and that the perfect bit is still to be built.

HUGHES TRI-CONE® ROCK BITS